

The Lighthouse Green Fuels Order

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Abbreviations

Abbreviation	In full
µm	micrometres
AADT	Annual Average Daily Traffic
ADMS	Atmospheric Dispersion Modelling Software
APIS	Air Pollution Information Service
AQAL	Air Quality Assessment Level
AQAP	Air Quality Action Plan
AQMA	Air Quality Management Area
ARN	Affected Road Network
As	Arsenic
BAT	Best Available Technique
BAT-AEL	Best Available Technique-Achievable Emission Level
BATC	BAT Conclusions
BPM	Best Practicable Means
BREF	BAT Reference Document
C ₆ H ₆	Benzene
Cd	Cadmium
CEMP	Construction Environmental Management Plan
CHP	Combined Heat and Power
CL	Critical levels
CLRTAP	Convention on Long-Range Transboundary Air Pollution
CO	Carbon monoxide
Co	Cobalt
Cr	Chromium
cSAC	candidate Special Area of Conservation
Cu	Copper
DCO	Development Consent Order
Defra	Department for Environment, Food and Rural Affairs
DEMP	Decommissioning Environmental Management Plan
DfT	Department for Transport
DLUHC	Department for Levelling Up, Housing and Communities
DMRB	Design Manual for Roads and Bridges
DM	Do Minimum
DS	Do Something

Abbreviation	In full
DWT	Deadweight Tonnage
EA	Environment Agency
EAL	Environmental Assessment Level
ECA	Emission Control Areas
EIA	Environmental Impact Assessment
ELV	Emission Limit Value
EPC	Engineering, Procurement, and Construction
EPR	The Environmental Permitting Regulations (England and Wales) 2016
EPUK	Environmental Protection United Kingdom
ES	Environmental Statement
EU	European Union
FID	Final Investment Decision
fCEMP	Framework Construction Environmental Management Plan
g/kWh	Grams per kilowatt hour
GHG	Greenhouse Gas
HCl	Hydrogen chloride
HDV	Heavy Duty Vehicle
HF	Hydrogen fluoride
Hg	Mercury
IAQM	Institute of Air Quality Management
IED	Industrial Emissions Directive
IMO	International Maritime Organisation
Keq/ha/yr	kilo equivalents per hectare per year
KgN/ha/yr	Kilograms of nitrogen per hectare per year
KgNeq/ha/yr	kilograms of nitrogen equivalent per hectare per year
KgSeq/ha/yr	kilograms of sulphur equivalent per hectare per year
kW	kilowatt
kWh	Kilowatt hour
LAQM	Local Air Quality Management
LCP	Large Combustion Plant
LDV	Light Duty Vehicle
LNG	Liquefied Natural Gas
LNR	Local Nature Reserves
LWS	Local Wildlife Sites
m/m	Mass by mass

Abbreviation	In full
MARPOL	International Convention for the Prevention of Pollution from Ships
MBC	Middlesbrough Borough Council
MCP	Medium Combustion Plant
Mn	Manganese
NAQS	National Air Quality Strategy
NECA	Oxides of Nitrogen Emissions Control Area
Ni	Nickel
NH ₃	Ammonia
NNR	National Nature Reserves
NO	Nitric oxide
NO ₂	Nitrogen dioxide
NO _x	Oxides of nitrogen
NPPF	National Planning Policy Framework
NPS	National Policy Statement
NRA	Navigation Risk Assessment
NRMM	Non-Road Mobile Machinery
Pb	Lead
PC	Process Contributions
PEC	Predicted Environmental Concentration
PEIR	Preliminary Environmental Information Report
PM	Particulate Matter
PPG	Planning Practice Guidance
pSPA	provisional Special Protection Area
RCBC	Redcar and Cleveland District Council
RPM	Revolutions per Minute
SAC	Special Area of Conservation
SAF	Sustainable Aviation Fuel
Sb	Antimony
SCMFD	Sulphur Content of Marine Fuels Directive
SCR	Selective Catalytic Reduction
SECA	SO _x and Particulate Matter Emissions Control Area
SNCR	Selective Non-Catalytic Reduction
SO ₂	Sulphur Dioxide
SO _x	Sulphur oxides
SPA	Special Protection Area

Abbreviation	In full
SSSI	Site of Special Scientific Interest
STBC	Stockton-on-Tees Borough Council
TI	Thallium
TOMP	Toxic Organic Micro Pollutants
UKEAP	UK Eutrophying & Acidifying Network
UNECE	United Nations Economic Commission for Europe
V	Vanadium
VOCs	Volatile Organic Compounds
WHO	World Health Organisation

8.1 Introduction

8.1.1 This chapter of the Environmental Statement (ES) addresses the potential air quality effects of the Proposed Development. Air quality studies are concerned with the presence of airborne pollutants in the atmosphere. This chapter describes the relevant air quality legislation, guidance and policy context and presents the methodology used in the assessment of the Proposed Development. It assesses the existing air quality conditions in the vicinity of the Proposed Development and the likely changes that would arise as a result of the construction and operational phases. It predicts the changes in air pollutant concentrations in the local area in terms of the potential effects on human health and ecological receptors. Mitigation measures are proposed which (where necessary) would be implemented to reduce the impact of the Proposed Development on air quality.

8.1.2 In particular, this chapter considers potential impacts on identified sensitive human health and ecological receptors in terms of:

- dust generation during construction of the Proposed Development;
- emissions from road traffic, shipping and Non-Road Mobile Machinery (NRMM) during the construction phase;
- emissions from road traffic and shipping during the operational phase;
- emissions from the operational phase of the Proposed Development; and
- the potential effects of the eventual decommissioning of the Proposed Development.

8.1.3 The air quality assessment is summarised in this chapter and set out fully in the following documentation:

- **Figure 8.1 to 8.16 (ES Volume II, Application Document Ref. 6.2);**
- **Appendix 8A: Air Quality – Construction Air Quality Assessment (ES Volume III, Application Document Ref. 6.3); and**
- **Appendix 8B: Air Quality – Operational Air Quality Assessment (ES Volume III, Application Document Ref. 6.3).**

8.1.4 The air quality assessment considers impacts in relation to the extent of the entire Proposed Development, which includes the Main Site as well as the Wider Site including access and utility/pipeline corridors. Further information on the description of the Proposed Development can be found



in **Chapter 3: Site and Surrounding Area (ES Volume I, Application Document Ref. 6.1).**

8.2 Legislation and planning policy context

Overview

- 8.2.1 This section of the ES outlines the legislation, policy and guidance which is relevant to the Proposed Development with reference to air quality.

Legislation

Air quality legislation

- 8.2.2 Some pollutants have standards expressed as annual average concentrations due to the chronic way in which they affect health or the natural environment i.e. effects occur after a prolonged period of exposure to elevated concentrations. Other pollutants have standards expressed as 24-hour or 1-hour average concentrations due to the acute way in which they affect health or the natural environment i.e. after a relatively short period of exposure. Some pollutants have standards expressed in terms of both long and short-term concentrations.
- 8.2.3 The principal air quality legislation within the United Kingdom is The Air Quality Standards Regulations 2010 ('The 2010 Regulations') [Ref 1], subsequently amended in 2016 [Ref 2], which transposes the requirements of the European Union's (EU) European Ambient Air Quality Directive 2008 [Ref 3] and the 2004 fourth Air Quality Daughter Directive [Ref 4]. The 2010 Regulations set air quality limits for a number of major air pollutants that have the potential to impact public health, such as nitrogen dioxide (NO₂), sulphur dioxide (SO₂), carbon monoxide (CO), and particulate matter (PM₁₀, which is particulate matter of 10 micrometres (µm) diameter or less). The 2010 Regulations also include an exposure reduction objective for PM_{2.5} in urban areas and a national target value for PM_{2.5} (PM_{2.5} is particulate matter of 2.5µm diameter or less).
- 8.2.4 For PM_{2.5}, the objective set by the Department for Environment, Food and Rural Affairs (Defra) for local authorities is to work towards reducing concentrations without setting any specific numerical value [Ref 7]. The Environmental Targets (Fine Particulate Matter) (England) Regulations. (2023) set a maximum concentration of 10µg/m³ to be achieved across England by 2040 but this is not specific to individual local authorities and is to be assessed at a national level [Ref 7]. In the absence of a specific numerical objective, it is convention to assess local air quality impacts against the limit value, originally set at 25µg/m³ and currently set at 20µg/m³.
- 8.2.5 Defra published its 25 Year Environment Plan in 2018 [Ref 5]. The Environment Act 2021 ('the Environment Act') [Ref 10] requires Defra to review this Plan at least every five years. The Environmental Improvement Plan 2025 marks the second revision [Ref 6], outlining the progress made

since the first revision in 2023 [Ref 7] and expanding on the goals defined in the original plan, including the aim of achieving clean air.

8.2.6 The Environmental Improvement Plan 2025 sets out the new air quality targets [Ref 6], which have been set for concentrations of PM_{2.5} and details the role of local authorities in helping them meet both their targets and existing commitments. Additionally, it outlines the roles of the industry, agricultural sectors and the Department for Transport (DfT) in coordinating efforts to achieve both new and ongoing targets and commitments.

8.2.7 The following commitments from the 2025 Plan [Ref 6] are relevant:

- *“Commitment 19: Deliver 2030 emissions targets to reduce anthropogenic emissions for the following pollutants against a 2005 baseline level:*
 - i. ammonia (NH₃) 16% reduction*
 - ii. nitrogen dioxide (NO₂) 73% reduction*
 - iii. sulphur dioxide (SO₂) 88% reduction*
 - iv. Particulate Matter (PM_{2.5}) 46% reduction*
- *Commitment 20: Deliver air pollution levels set out in the Air Quality Standards Regulations in local areas.*
- *Commitment 21: Deliver air quality targets for PM_{2.5} concentration and exposure:*
 - i. an annual mean concentration target of 10µg/m³ to be achieved by December 2030*
 - ii. a population exposure reduction target of 30% compared to 2018 to be achieved by December 2030 (Environment Act interim targets).”*

8.2.8 In March 2023, the Department for Levelling Up, Housing and Communities (DLUHC)ⁱ explained that the new PM_{2.5} targets will [Ref 8]:

“Need to be integrated into the planning system, and in setting out planning guidance for local authorities and businesses, we will consider the specific characteristics of PM_{2.5}. The guidance will be forthcoming in due course, until then we expect local authorities to continue to assess local air quality impacts in accordance with existing guidance.”

8.2.9 Defra has also provided advice which explains that there is no current requirement to consider the new PM_{2.5} targets in planning decisions and that guidance to local planning authorities will be forthcoming before this

ⁱ Name has now reversed to the Ministry of Housing, Communities and Local Government.

position changes [Ref 9]. In the future, when planning decisions do need to consider the new targets, the expectation is that this will focus on reducing emissions from new development rather than there being a direct requirement for planning-related air quality assessments to predict PM_{2.5} concentrations.

- 8.2.10 Although the new PM_{2.5} targets are not required to be assessed against, this has been used here as a conservative assessment.
- 8.2.11 The Environment Act [Ref 10] amended the Environment Act 1995 [Ref 11], which requires the UK Government to produce a National Air Quality Strategy (NAQS), last reviewed in 2007 [Ref 12], containing air quality objectives and timescales to meet those objectives. These objectives apply to outdoor locations where people are regularly present and do not apply to occupational, indoor or in-vehicle exposure. The human health objectives that are applicable to this assessment are set out in Table 8.1.

Table 8.1 National Air Quality Strategy objectives (NAQS) – protection of human health

Pollutant	Concentration (µg/m ³)	Measured as	Source
Nitrogen dioxide (NO ₂)	40	Annual mean	EU air quality limit value
	200	1-hour mean – not to be exceeded more than 18 times a year (99.79 th percentile)	
Particulate Matter (PM ₁₀)	40	Annual mean	EU air quality limit value
	50	24-hour mean – not to be exceeded more than 35 times a year (90.41 st percentile)	
Particulate Matter (PM _{2.5})	20	Annual mean	EU air quality limit value
	10	Annual mean (to be achieved by 2030)	The Environmental Improvement Plan [Ref 6]
Carbon monoxide (CO)	10,000	Maximum daily running 8-hour mean	EU air quality limit value
Sulphur dioxide (SO ₂)	125	24-hour mean – not to be exceeded more than 3 times a year (99.2 nd percentile)	EU air quality limit value
	350	1-hour mean – not to be exceeded more than 24 times a	UK AQS objective

Pollutant	Concentration ($\mu\text{g}/\text{m}^3$)	Measured as	Source
		year (99.7 th percentile)	
	266	15-minute mean – not to be exceeded more than 35 times a year (99.9 th percentile)	EU air quality limit value
Volatile Organic Compounds (VOCs) (as Benzene (C_6H_6))	5	Annual mean	EU air quality limit value
Arsenic (As)	0.006	Annual mean	UK Target Value
Cadmium (Cd)	0.005	Annual mean	UK Target Value
Lead (Pb)	0.5	Annual mean	EU air quality limit value
Nickel (Ni)	0.02	Annual mean	UK Target Value

- 8.2.12 The Environment Act [Ref 10] requires local authorities to undertake an assessment of local air quality to establish whether the objectives are being achieved, and to designate Air Quality Management Areas (AQMA) if improvements are necessary to meet the objectives. Where an AQMA has been designated, the local authority must draw up an Air Quality Action Plan (AQAP) describing the measures that will be put in place to assist in achieving the objectives. Defra has responsibility for coordinating assessments and AQAP for the UK as a whole.
- 8.2.13 No AQMAs have been declared for the area relevant to the Proposed Development.
- 8.2.14 Based on Defra forecast models and local authority monitoring data, no exceedances of the EU standards have been identified in the vicinity of the Proposed Development.
- 8.2.15 The impact of emissions from the Proposed Development on sensitive ecological receptors are quantified in this assessment in two ways:
- as direct impacts arising due to increases in atmospheric pollutant concentrations, assessed against defined ‘critical levels’; and
 - as indirect impacts arising through deposition of acids and nutrient to the ground surface, assessed against defined ‘critical loads’.
- 8.2.16 The critical levels for oxides of nitrogen (NO_x) and SO_2 are set in the EU Ambient Air Quality Directive [Ref 3] and transposed into law by the Air Quality Standards Regulations 2010 [Ref 1, Ref 2]. The EU Ambient Air Quality Directive defines a critical level as:

“A level fixed on the basis of scientific knowledge, above which direct adverse effects may occur on some receptors, such as trees, other plants or natural ecosystems but not on humans”.

- 8.2.17 Under the EU Ambient Air Quality Directive, assessment of compliance with the critical levels is strictly only required at locations more than 20km from towns with more than 250,000 inhabitants or more than 5km from other built-up areas, industrial installations or motorways. In practice, however, assessment against critical levels for vegetation is frequently undertaken to inform planning and permitting regardless of this definition.
- 8.2.18 As a result, critical levels have been applied to this assessment for the determination of potential impacts on ecological sites regardless of their location.
- 8.2.19 Critical levels for ammonia (NH₃) are set out in the United Nations Economic Commission for Europe (UNECE) Convention on Long-Range Transboundary Air Pollution (CLRTAP) [Ref 13]. Whilst hydrogen fluoride (HF) critical levels are derived from a variety of academic studies and are referenced on both the Air Pollution Information Service (APIS) website [Ref 14] and Environment Agency (EA) Risk Assessment guidance [Ref 15].
- 8.2.20 The critical levels applied in this assessment are set out in Table 8.2 and apply to all habitat types present at the ecological receptor. In the case of sulphur dioxide (SO₂) and ammonia (NH₃), the greater sensitivity of lichens and bryophytes to this pollutant is reflected in the application of two critical levels, with a stricter critical level to be applied to locations where such species are present.

Table 8.2 Critical Levels (CL) – Protection of vegetation and ecosystems

Pollutant	Concentration (µg/m ³)	Measured as	Source
Nitrogen oxides (NO _x)	30	Annual mean	EU air quality limit value
	75	24-hour mean	UK Target Value
	200	24-hour mean (higher critical level) ^[1]	
Sulphur dioxide (SO ₂)	20	Annual mean	EU air quality limit value
	10	Annual mean (for ecosystems where lichens and bryophytes are present)	
Ammonia (NH ₃)	3	Annual mean	UK Target Value
	1	Annual mean (for ecosystems where lichens and bryophytes are present)	
Hydrogen fluoride (HF)	0.5	Weekly mean	UK Target Value
	5	Daily mean	

^[1] The critical level is generally considered to be 75µg/m³, but this only applies where there are high concentrations of SO₂ and ozone (O₃), which is not generally the current situation in the UK. Given the O₃ and SO₂ concentrations in the vicinity of the Proposed Development are below the relevant CLs, the Institute of Air Quality Management (IAQM) consider the higher value of 200 µg/m³ can be used as a short-term critical load [Ref 24].

8.2.21 Critical load criteria for the deposition of nutrient nitrogen and acidifying species are dependent on the habitat type and species present and are specific to the sensitive receptors considered within the assessment. The relevant critical loads are detailed on the APIS website [Ref 14] and are expressed as a range, to account for the variation in ecosystem response across the whole of Europe. The critical load criteria adopted for the sensitive ecological receptors considered in the assessment are presented in **Appendix 8B: Air Quality - Operational Assessment (ES Volume III, Application Document Ref. 6.3)**, and the assessment has used the lower end of the critical load range for the relevant habitat type present to ensure a conservative assessment is carried out.

Environmental permitting regulations

- 8.2.22 The EU's Industrial Emissions Directive (IED) [Ref 40] provides operational limits and controls to which a regulated plant must comply, including Emission Limit Values (ELV) for pollutant releases into the air.
- 8.2.23 The Environmental Permitting (England and Wales) Regulations 2016 (EPR) [Ref 17], transpose the requirements of the IED [Ref 40] into UK legislation. Activities listed under the EPR, such as Large Combustion Plant (LCP), Waste Management and Organic Chemical activities, require an

Environmental Permit to operate, issued by the EA. Performance against the relevant ELVs or Best Available Technique-Associated Emission Levels (BAT-AEL), as defined in the IED, associated BAT Reference Documents (BREFs and BAT Conclusions (BATC)) in relation to the Proposed Development would therefore be regulated through the Environment Permit.

- 8.2.24 Where legislative ambient air quality limits or objectives are not specified for the pollutant species potentially released from the Proposed Development, Environmental Assessment Levels (EAL), published in the EA's Risk Assessments for Specific Activities: Environmental Permits guidance, referred to as the EA's Risk Assessment guidance [Ref 15] can be used to assess potential health effects on the general population. Not all species that have ELVs, however, have EALs derived in the current version of the EA's Risk Assessment guidance [Ref 15] and therefore where these are not provided, EALs from a previous version of the guidance (Horizontal Guidance Note IPPC H1) have been used [Ref 18] to enable an assessment to be carried out.
- 8.2.25 The EAL applicable for this assessment for the protection of human health are presented in Table 8.3.

Table 8.3 Environmental Assessment Levels (EAL) – Human health

Pollutant	Concentration (µg/m³)	Measured as	Source
Carbon monoxide (CO)	30,000	1-hour mean	EA Risk Assessment guidance [Ref 15]
Ammonia (NH ₃)	180	Annual mean	
	2,500	1-hour mean	
Benzene (C ₆ H ₆)	30	24-hour mean (short term)	
Hydrogen chloride (HCl)	750	1-hour mean	
Hydrogen fluoride (HF)	16	Monthly mean	
	160	1-hour mean	
Antimony (Sb)	5	Annual mean	
	150	1-hour mean	
Cadmium (Cd)	0.03	24-hour mean (short term)	
Chromium, Chromium (II) and Chromium (III) compounds (as Cr)	2.0	24-hour mean (long term)	EA Risk Assessment guidance [Ref 15]
Hexavalent Chromium Cr (VI)	0.00025	Annual mean	
Cobalt (Co)	0.2	Annual mean	EA H1 Horizontal guidance [Ref 18]
	6	1-hour mean	
Copper (Cu)	0.05	24-hour mean (long term)	EA Risk Assessment guidance [Ref 15]
Lead (Pb)	0.25	Annual mean (Objective)	
Manganese (Mn)	0.15	Annual mean	
	1,500	1-hour mean	EA Risk Assessment guidance [Ref 15]
Mercury (Hg)	0.06	24-hour mean (long term)	
	0.6	1-hour mean	
Nickel (Ni)	0.7	1-hour mean	EA H1 Horizontal guidance [Ref 18]
Thallium (Tl)	1	Annual mean	
	30	1-hour mean	EA Risk Assessment guidance [Ref 15]
Vanadium (V)	1	24-hour mean (short term)	

8.2.26 Throughout the remainder of this chapter and the associated technical appendices, NAQS objectives, critical levels and EAL are collectively referred to as Air Quality Assessment Levels (AQAL).

- 8.2.27 The EA Risk Assessment Guidance [Ref 15] also stipulates a requirement to calculate the impact the substances listed in Table 8.4 have when they are absorbed by soils and leaves (known as ‘deposition’).

Table 8.4 Substance deposition ground limits

Pollutant	Score	Source
As	0.02	Environment Agency (EA) Risk Assessment guidance [Ref 15]
Cd	0.0009	
Cr	1.5	
Cu	0.25	
Pb	1.1	
Hg	0.004	
Ni	0.11	

Sensitive ecosystems

- 8.2.28 The UK is bound by the terms of Council Directive 92/43/EEC, on the conservation of natural habitats and of wild fauna and flora (‘Habitats Directive’) [Ref 19], Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds (‘Wild Birds Directive’) [Ref 20] and the Convention on Wetlands of International Importance especially as Wildfowl Habitats (‘Ramsar sites’) [Ref 21]. The Conservation of Habitats and Species Regulations 2017 (‘the 2017 Regulations’) [Ref 22] provide for the protection of European Sites created under these, i.e. Special Areas of Conservation (SAC) designated pursuant to the Habitats Directive and Special Protection Areas (SPA) and provisional SPA (pSPA) classified under the Wild Birds Directive. The Planning and Infrastructure Act 2025 [Ref 23] amended the Habitat Regulations to include Ramsar sites.
- 8.2.29 Specific provisions of the European Directives are also applied to SAC, and candidate SAC (cSAC), which requires these sites to be given special consideration, and for further assessment to be undertaken for any development which is likely to lead to a significant effect upon them.

Control of shipping emissions

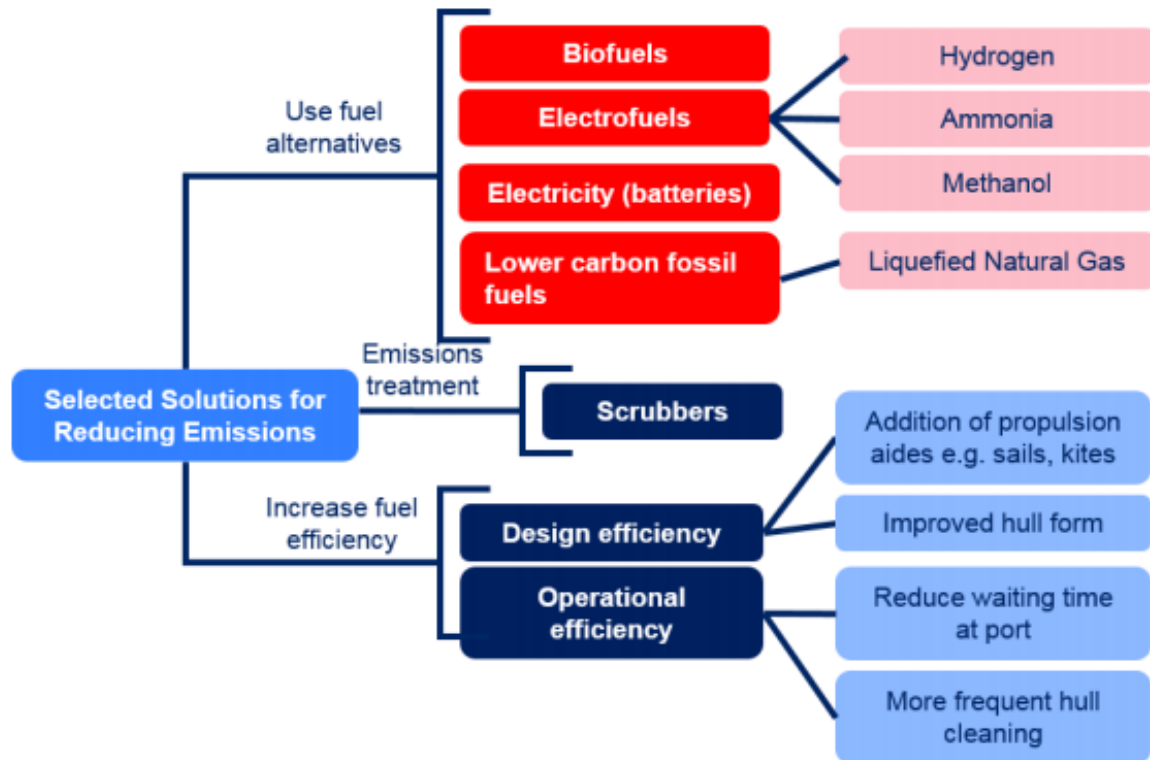
International Maritime Organisation Greenhouse Gas report

- 8.2.30 The International Maritime Organisation (IMO) provides the primary global regulatory framework governing emissions from international shipping. The fourth greenhouse gas (GHG) study was published in 2020 [Ref 27] and presented a global inventory of emissions from shipping covering the period 2012 to 2018.

- 8.2.31 The study indicates that shipping is a significant and growing contributor to global emissions accounting for approximately 3% of GHG emissions. In addition, it highlights that it is a significant source of air pollutants including NO_x, PM and SO_x, with these pollutants being directly relevant to air quality and ecological impact assessments, particularly in coastal and port environments.
- 8.2.32 The findings of the fourth IMO GHG study are directly applicable to air quality assessments, providing information on associated pollutant emissions and allowing for an overall assessment of impacts based on ship type, fuel and operation phase (e.g. at berth, manoeuvring or at sea).
- 8.2.33 The fourth IMO GHG study has been used as the basis for determining the potential impacts shipping emissions associated with the construction and operation of the Proposed Development.

Maritime 2050

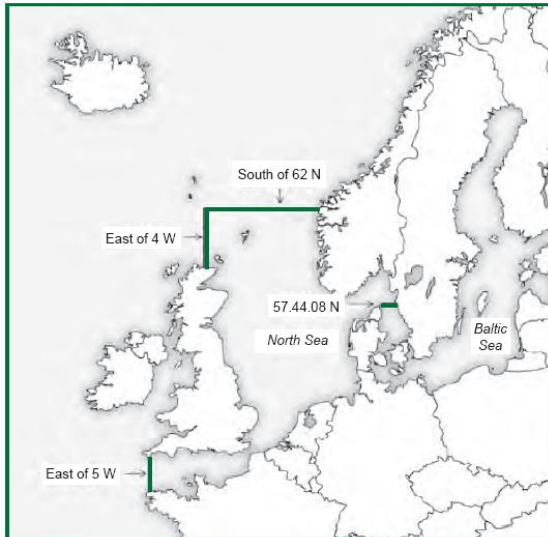
- 8.2.34 Maritime 2050 [Ref 27] was published by the DfT in January 2019. The report sets out a number of targets to drive forward the UK maritime sector by 2050, among these targets is the ambition to work towards zero emission shipping, stating the ambition “*for an environmentally sustainable sector, reducing impacts as close to zero as possible*”.
- 8.2.35 The strategy highlights four strands of action to help achieve this vision:
- Zero emission shipping;
 - Minimising the wider environmental impacts of maritime;
 - Adapting successfully to the impacts of climate change on the maritime sector; and
 - Achieving the goals through continued international leadership.
- 8.2.36 To reduce emissions from shipping the strategy suggests three methods:
- Treating emissions at exhaust;
 - Improving fuel efficiency; and
 - Substituting existing fuels with less polluting alternatives.
- 8.2.37 These methods are detailed in Inset 8.1.



Inset 8.1 Strategy's selected solutions for reducing emissions from shipping

MARPOL Annex VI

- 8.2.38 The International Convention for the Prevention of Pollution from Ships (MARPOL) is the main international convention covering prevention of pollution of the marine environment by ships from operational or accidental causes.
- 8.2.39 The IMO approved regulations for the prevention of air pollution from ships in MARPOL Annex VI [Ref 29], which entered into force in 2005. The IMO approved revisions to Annex VI [Ref 30] to reduce ship emissions further, which entered into force in 2015. This was followed by a further revision to Annex VI in 2021 [Ref 31].
- 8.2.40 MARPOL Annex VI introduced Emission Control Areas (ECAs) to reduce emissions of air pollutants further in designated sea areas. ECAs are designated for the control of NO_x emissions (NECA) and SO_x and particulate matter emissions (SECA). Currently there are four ECAs: Baltic Sea (SECA), the North Sea (SECA), North America (SECA and NECA) and the United States Caribbean Sea areas (NECA). The North Sea SECA runs along the coastline of the UK, and the extent is illustrated in Inset 8.2.

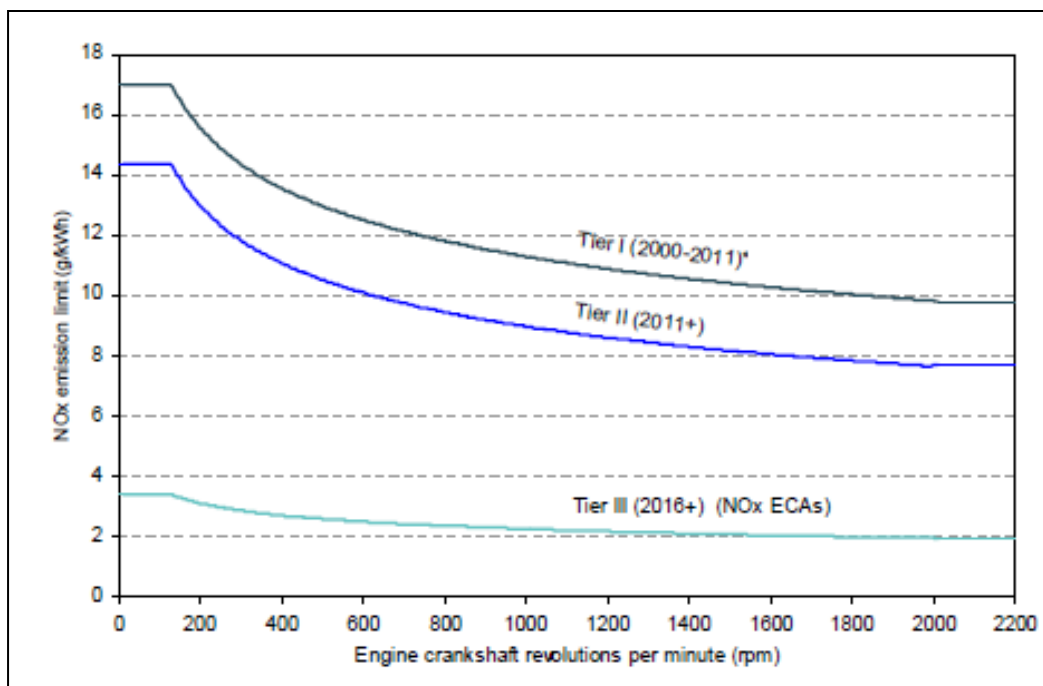


Inset 8.2 Boundary of North Sea SECA [Ref 32]

8.2.41 Regulation 13 of MARPOL Annex VI details the tiered NO_x emissions limits applicable to “marine diesel engine of over 130 kW output power other than those used solely for emergency purposes irrespective of the tonnage of the ship onto which such engines are installed” [Ref 33]. These tiered emissions limits are based on two main parameters:

- Ship construction date; and
- Engine crankshaft revolutions per minute.

8.2.42 Details of these variables and the corresponding emissions limits are presented in Inset 8.3 and Table 8.5. The Tier III controls apply only to the specified ships while operating in NECAs, outside such areas the Tier II controls apply.

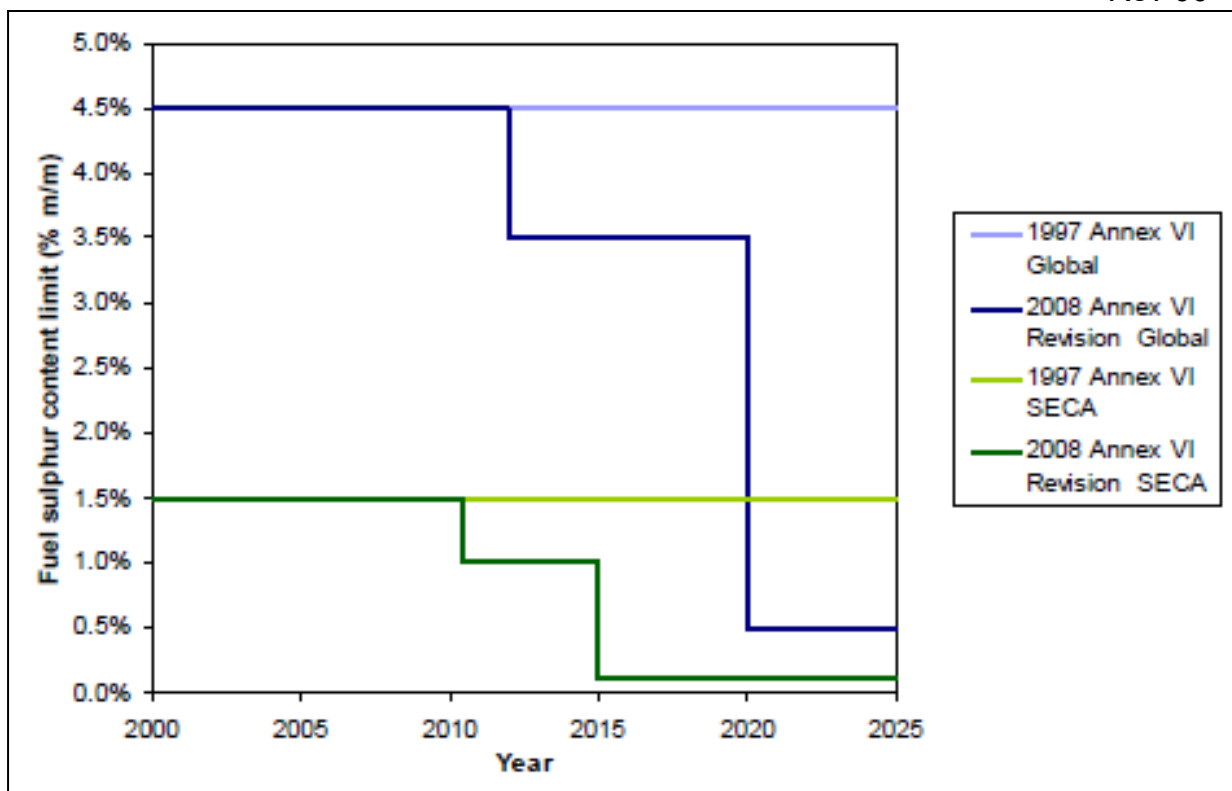


Inset 8.3 Tiered NOx emission limits [Ref 34]

Table 8.5 Tiered NOx emission limits

Tier	Ship construction date on or after	Total weighted cycle limit (g/kWh) n = engines rated speed (revolutions per minute)		
		n < 130	n = 130 - 1999	n ≥ 2000
I *	1 January 2000	17.0	$45 \times n^{(-0.2)}$ (e.g. 720 rpm – 12.1)	9.8
II	1 January 2011	14.4	$44 \times n^{(-0.23)}$ (e.g. 720 rpm – 9.7)	7.7
III	1 January 2016	3.4	$9 \times n^{(-0.2)}$ (e.g. 720 rpm – 2.4)	1.96

8.2.43 Regulation 14 of MARPOL Annex VI specifies the fuel sulphur content limit inside and outside SECAs (Inset 8.4 and Table 8.6). Emission control for SO_x and particulate matter apply to all fuel oil, combustion equipment and devices onboard, including both main engine and all auxiliary engines together, along with items such as boilers and inert gas generators that may be installed on a vessel.



Inset 8.4 Fuel sulphur content limit (by mass) [Ref 34]

Table 8.6 Fuel sulphur content limit (by mass)

Outside an SECA	Inside an SECA
4.50% m/m prior to 1 January 2012	1.50% m/m prior to 1 July 2010
3.50% m/m on and after 1 January 2012	1.00% m/m on and after 1 July 2010
0.50% m/m on and after 1 January 2020*	0.10% m/m on and after 1 January 2015

Sulphur content of marine fuels directive

8.2.44 In 2005 the European Commission published the Sulphur Content of Marine Fuels Directive (SCMFD) [Ref 35], which used MARPOL Annex VI [Ref 33] to determine the acceptable limits for the fuel sulphur content used in SECAs. The SCMFD came into force in 2005, and set:

- A 1.5% limit on fuel sulphur content used by all ships in the SECAs of the Baltic Sea from 11th August 2006, and the North Sea and English Channel from 11th August 2007;
- A 1.5% limit on fuel sulphur content used by passenger ships on regular services between EU ports from 11th August 2006; and
- A 0.1% limit on fuel sulphur content used by inland waterway vessels and by seagoing ships at berth in EU ports from January 2010. The limit for ships at berth only applies to ships at berth for more than 2 hours. In

practice, this is usually implemented by switching off main engines and auxiliary engines with lower sulphur fuel.

- 8.2.45 An amended SCMFD came into force in 2012 [Ref 36] and adopted the fuel sulphur content limits specified in MARPOL Annex VI Regulation 13 [Ref 33]; i.e. 0.5% fuel sulphur content limit from 1st January 2020 globally, with an additional restriction of 0.1% fuel sulphur content limit specifically in SECAs from 1st January 2015.

Fuel quality directive 2009

- 8.2.46 In 2009 the European Commission published the Fuel Quality Directive (2009/30/EC) [Ref 35], which adopted a 0.001% limit on the sulphur content of fuel used by inland waterway vessels not at sea and recreational craft from January 2011.

Alternative fuels infrastructure directive 2014

- 8.2.47 The European Commission published the alternative fuels infrastructure Directive (2014/94/EU) [Ref 38], in 2014. This legislation discusses the use of electricity and hydrogen for fuel as opposed to conventional diesel and petrol.

- 8.2.48 Shore-side electricity is also discussed as a clean power supply in Sections 34 and 35. The Directive highlights the environmental benefits of this measure, and states that:

“the standardisation of shore power should not impede the existing systems used and Member States should allow maintenance and upgrading of existing systems with a view to ensuring their efficient use without full compliance with the technical specification set out in the Directive”.

- 8.2.49 Article 3 (National policy framework) of the Directive states that *“Each Member State shall adopt a national policy framework for the development of the market as regards alternative fuels in the transport sector and the deployment of the relevant infrastructure”*. One of the elements includes *“an assessment of the need to install refuelling points for LNG in ports outside the TEN-T Core Network”*. It also requires that *“Based on the national policy frameworks, the Commission shall publish and regularly update information on the national targets and the objectives submitted by each Member State regarding infrastructure for shore-side electricity supply in maritime and inland ports”*.

- 8.2.50 Article 4 (Electricity supply for transport) paragraph 5 and 6, which refers to the compliance to the technical specifications of the IEC/ISO/IEEE 8005-1 standard), state that:

“Member States shall ensure that the need for shore-side electricity supply for inland waterway vessels and seagoing ships in maritime and inland

ports is assessed in their national policy frameworks. Such shore-side electricity supply shall be installed as a priority in ports of the TEN-T Core Network, and in other ports, by 31 December 2025, unless there is no demand and the costs are disproportionate to the benefits, including environmental benefits.

Member States shall ensure that shore-side electricity supply installations for maritime transport, deployed or renewed as from 18 November 2017, comply with the technical specifications set out in point 1.7 of Annex II”.

8.2.51 Article 6 (Natural gas supply for transport) paragraph 1 to 3 state that:

“Member States shall ensure, by means of their national policy frameworks, that an appropriate number of refuelling points for LNG are put in place at maritime ports, to enable LNG inland waterway vessels or seagoing ships to circulate throughout the TEN-T Core Network by 31 December 2025. Member States shall cooperate with neighbouring Member States where necessary to ensure adequate coverage of the TEN-T Core Network.

Member States shall ensure, by means of their national policy frameworks, that an appropriate number of refuelling points for LNG are put in place at inland ports, to enable LNG inland waterway vessels or seagoing ships to circulate throughout the TEN-T Core Network by 31 December 2030. Member States shall cooperate with neighbouring Member States where necessary to ensure adequate coverage of the TEN-T Core Network.

Member States shall designate in their national policy frameworks the maritime and inland ports that are to provide access to the refuelling points for LNG referred to in paragraphs 1 and 2, also taking into consideration actual market needs.”

Policy

National planning policy context

8.2.52 Further to section 104 of the 2008 Act, National Policy Statements (NPS) form the primary basis for the assessment and determination of the Proposed Development. The Overarching National Policy Statement on Energy EN-1 ('NPS EN-1') [Ref 41] states that:

“The planning and pollution control systems are separate but complementary. The planning system controls the development and use of land in the public interest...Pollution control is concerned with preventing pollution through the use of measures to prohibit or limit the releases of substances to the environment from different sources to the lowest practicable level. It also ensures that ambient air and water quality meet standards that guard against impacts to the environment or human health.” (paragraph 4.12.2)

- 8.2.53 Paragraph 5.2.9 of NPS EN-1 also requires the consideration of significant air emissions, their mitigation and any residual effects, the predicted absolute emission levels after application of mitigation, the relative change in air quality from existing concentrations and any potential eutrophication impacts as a result of the Proposed Development project stages, including contributions from additional road traffic. Where a project could result in deterioration in air quality in an area where national air quality limits are not being met or may lead to a new area breaching national air quality limits, or where substantial changes in air quality concentrations are predicted, such effects would be expected to be given substantial weight in consideration of the acceptability of the proposal. Where a project is likely to lead to a breach of statutory air quality limits, objectives or targets, the developer should work with the relevant authorities to secure appropriate mitigation measures to ensure those limits, objectives or targets are not breached.
- 8.2.54 Paragraph 5.2.15 of NPS EN-1 states that *“Many activities involving air emissions are subject to pollution control. The considerations set out in Section 4.12 on the interface between planning and pollution control therefore apply. The Secretary of State must also consider duties under other legislation including duties under the Environment Act 2021 in relation to environmental targets and have regard to policies set out in the government’s Environmental Improvement Plan.”*
- 8.2.55 The NPS for renewable energy infrastructure EN-3 [Ref 42] covers energy from biomass and/or waste and recognises that biomass and/or waste combustion for electricity generation plays an important role in meeting the UK’s energy needs and supports the decarbonisation of the sector. NPS EN-3 contains specific requirements for applicants to provide details on the air quality and emissions that will result from their energy plant, alongside the abatement technologies adopted.
- 8.2.56 The Biomass Policy Statement [Ref 43] sets out the strategic aims for the role of biomass across the economy in the short, medium, and long term in achieving our net zero target and informs how biomass will be supported in the future and utilised to help achieve emissions and wider environmental targets.
- 8.2.57 Table 8.7 provides a summary of relevant NPS advice regarding air quality and emissions and sets out where matters are assessed within this chapter. For detail as to the Applicant’s compliance with the relevant NPS, please see the Policy Compliance and Accordance Tables (Application Document Ref 5.2.2).

Table 8.7 Summary of NPS advice on air quality and emissions

Summary of NPS	Consideration within the Chapter
NPS EN-1	
Paragraph 5.2.1 states: <i>“Energy infrastructure development can have adverse effects on air quality.... Air emissions include particulate matter (for example dust) up to a diameter of ten microns (PM₁₀) and up to a diameter of 2.5 microns (PM_{2.5}) as well as gases such as sulphur dioxide, carbon monoxide and nitrogen oxides (NO_x).</i>	Particulate emissions have been included in the assessment of construction dust and traffic impacts (Appendix 8A: Construction Air Quality Assessment (ES Volume III, Application Document Ref. 6.3)). NO _x and CO emissions from the operational Proposed Development have also been considered Appendix 8B: Operational Air Quality Assessment (ES Volume III, Application Document Ref. 6.3) .
Paragraph 5.2.2 states: <i>“Legal limits for pollutants in ambient air are set out in the Air Quality Standards Regulations 2010 and...national objectives set out in the Air Quality (England) Regulations ...”</i>	Predicted impacts from construction and operational activities have been assessed against these limits, as set out in Table 8.1 of this Chapter.
Paragraph 5.2.3 states: <i>“For many air pollutants there is not a threshold value below which there is no health impact, so it is important that energy infrastructure schemes consider not just how a scheme may impact statutory air quality limits, objectives or targets but also measures to mitigate all emissions in order to minimise human exposure to air pollution, especially for those who are more susceptible to the impacts of poor air quality.”</i>	Emissions from the Proposed Development will be controlled in line with the applicable BAT-AEL and ELV, which are set at levels to protect human health. Consideration has also been given to baseline air quality conditions in the locality and the ELVs that are achievable for the technology, for the SAF and CHP plants based on legislative limits and use of BAT.
Paragraph 5.2.4 states: <i>“...a particular effect of air emissions from some energy infrastructure may be eutrophication, which is the excessive enrichment of nutrients in the environment. Eutrophication from air pollution results mainly from emissions of NO_x and ammonia”</i>	Air quality impacts associated with NO _x , NH ₃ and nitrogen deposition on designated ecological receptors have been assessed in Appendix 8B: Operational Air Quality Assessment (ES Volume III, Application Document Ref. 6.3) and summarised in Section 8.6.
Paragraph 5.2.5 states: <i>“Design of exhaust stacks, particularly height, is the primary driver for the delivery of optimal dispersion of emissions and is often determined by statutory requirements. The optimal stack height is dependent upon the local terrain and meteorological conditions, in combination with the emission characteristics of the plant. The EA will require the exhaust stack height of a thermal combustion generating plant, including fossil fuel generating stations and waste or biomass plant, to be optimised in relation to impact on air quality. The Secretary of State need not, therefore, be concerned with the exhaust</i>	A stack height evaluation has been carried out and is detailed in Appendix 8B: Operational Air Quality Assessment (ES Volume III, Application Document Ref. 6.3) , and summarised in Section 5, to support the justification of the proposed height for Chapter 13: Landscape and Visual Amenity (ES Volume I, Application Document Ref. 6.1) and to determine the maximum stack height to support the Rochdale Envelope approach. The final stack heights will, however, be determined as part of the Environmental Permitting process.

Summary of NPS	Consideration within the Chapter
<i>stack height optimisation process in relation to air emissions, though the impact of stack heights on landscape and visual amenity will be a consideration”.</i>	
Paragraph 5.2.7 states: <i>“Proximity to emission sources can have significant impacts on sensitive receptor sites for air quality, such as education or healthcare sites, residential use or sensitive or protected ecosystems. Projects near a sensitive receptor site for air quality should only be proposed in exceptional circumstances if no viable alternative site is available. In these instances, substantial mitigation of any expected emissions will be required”</i>	Section 8.3 outlines the sensitive human and ecological receptor sites identified within the vicinity of the Proposed Development which were considered and included in the construction traffic, operational traffic and shipping alongside operational plant assessments, following relevant IAQM and EA guidance, as detailed in Section 8.2.
Paragraph 5.2.9 states: <i>“The ES should describe:</i> <i>“existing air quality concentrations and the relative change in air quality from existing levels;</i> <i>any significant air quality effects, mitigation action taken and any residual effects, distinguishing between the project stages and taking account of any significant emissions from any road traffic generated by the project;</i> <i>the predicted absolute emissions, concentration change and absolute concentrations as a result of the proposed project, after mitigation methods have been applied; and</i> <i>any potential eutrophication impacts.”</i>	The air quality impacts of all project stages have been assessed in this chapter including consideration of residual effects in Section 8.8. Appropriate mitigation has been considered as part of the air quality assessment and is outlined in Section 8.7. Eutrophication impacts have been assessed in respect to the deposition of nitrogen from the Proposed Development, within Appendix 8A: Construction Air Quality Assessment (ES Volume III, Application Document Ref. 6.3) and Appendix 8B: Operational Air Quality Assessment (ES Volume III, Application Document Ref. 6.3) .
Paragraph 5.2.10 states: <i>“applicants should consider The Environment Targets (Fine Particulate Matter) (England) Regulations 2022 and associated Defra guidance”</i>	The Environment Targets (Fine Particulate Matter) (England) Regulations 2022 and associated Defra guidance have been included as part of the air quality assessment [Ref 7] in the application of the AQAL for PM _{2.5} shown in Table 8.1.
NPS EN-3	
Paragraph 2.7.41 states: <i>“Applicants should include in the ES an assessment of the air emissions resulting from the proposed infrastructure and demonstrate compliance with the relevant regulations.”</i>	An assessment of air emissions resulting from the proposed infrastructure has been undertaken as part of the air quality assessment and has been compared to the relevant regulations.
Paragraph 2.7.42 states: <i>“Applicants should include in the ES an assessment of the air emissions associated with delivery and movement of people, fuel and materials. This should include consideration of cumulative effects from</i>	An assessment of air emissions associated with delivery and movement of people, fuel and materials has been undertaken as part of the air quality assessment and cumulative effects from construction, operation and vehicle movements have been considered.

Summary of NPS	Consideration within the Chapter
<i>construction, operation and vehicle movements."</i>	
Paragraph 2.7.43 states: <i>"Applicants should take into account the presence of Air Quality Management Areas, NO2 Programme Clean Air Plans and proximity to large numbers of people and vulnerable receptors (e.g. health facilities, care homes and schools) when considering site selection."</i>	The baseline assessment undertaken as part of the air quality assessment is outlined in Section 8.4. This outlines the limited number of sensitive human receptors in the vicinity of the site. The nearest AQMA is approximately 23km to the south east of the Proposed Development. Given the distance to the AQMA, it is considered very unlikely that it would be affected by the Proposed Development.
Paragraph 2.7.68 states: <i>"Applicants should provide details on the air quality and emissions that will result from their plant, which may include NO_x, SO_x, NMVOCsⁱⁱ or particulates (PM_{2.5}, PM₁₀). They should detail the abatement technologies adopted, which should be those set out in the relevant sector guidance notes as produced by the Environment Agency (EA). The EA will determine if the technology selected for the waste/biomass combustion generating station is considered Best Available Technique (BAT), and that therefore the Secretary of State does not need to consider equipment selection in its determination process."</i>	Emissions from the operational plant have been assessed as part of the application and includes NO _x , SO ₂ , VOCs and particulates (PM ₁₀ and PM _{2.5}). Details are provided in Section 8.6 and potential mitigation or abatement measures are outlined in Section 8.7.
Paragraph 2.7.102 states <i>"Where a proposed EfW plant or biomass generating station meets the requirements of the EPR and BAT conclusions and will not exceed the local air quality standards or adversely affect the delivery of the Environment Act 2021 PM_{2.5} targets, National Emission Ceiling Regulations emissions limits or other statutory limits, objectives or targets, the Secretary of State should consider the proposed waste generating station as having acceptable impacts on health."</i>	The CHP plant will meet the requirements of the Environmental Permitting Regulations 2016 and the relevant BAT conclusions, and dispersion modelling provided in Appendix 8B: Operational Air Quality Assessment (ES Volume III, Application Document Ref. 6.3) demonstrated that AQALs will not be exceeded.

8.2.58 Table 8.8 provides a summary of relevant NPS advice regarding dust, odour, smoke and steam.

ⁱⁱ Non-Methane Volatile Organic Compounds

Table 8.8 Summary of NPS advice on dust, odour, smoke and steam

Summary of NPS	Consideration within the Chapter
NPS EN-1	
Paragraph 5.7.1 states: <i>“During the construction, operation and decommissioning of energy infrastructure there is potential for the release of a range of emissions such as odour, dust, steam, smoke, artificial light and infestation of insects. All have the potential to have a detrimental impact on amenity or cause a common law nuisance or statutory nuisance under Part III, Environmental Protection Act 1990. However, they are not regulated by the environmental permitting regime, so mitigation of their impacts will need to be included in the Development Consent Order”</i>	An assessment of the impacts of dust during construction has been carried out and is detailed in Appendix 8A: Construction Air Quality Assessment (ES Volume III, Application Document Ref. 6.3). The assessment of emissions of particulates has been carried out and is detailed in Appendix 8B: Operational Air Quality Assessment (ES Volume III, Application Document Ref. 6.3). This appendix also includes an assessment of visible plumes (in Annex C) (i.e. referred to as steam and smoke in EN-1 Paragraph 5.7.1). Dust emissions during operation will be controlled through the use of BAT for the storage and transportation of biomass and waste, and in line with the requirements of the Environmental Permit. Additional details on the control of operational dust are provided in Section 8.5.
Paragraph 5.7.4 states: <i>“For energy NSIPs of the type covered by this NPS, some impact on amenity for local communities is likely to be unavoidable. The aim should be to keep impacts to a minimum, and at a level that is acceptable.”</i>	The Statutory Nuisance Statement (Application Document Ref. 5.5) addresses the impact on amenity for local communities.
Paragraph 5.7.6 states: <i>“In particular, the assessment provided by the applicant should describe:</i> <i>• The type, quantity and timing of emissions;</i> <i>• Aspects of the development which may give rise to emissions;</i> <i>• Premises or locations that may be affected by the emissions;</i> <i>• Effects of the emission on identified premises or locations;</i> <i>• Measures to be employed in preventing or mitigating the emissions.”</i>	This chapter identifies sensitive receptors in the vicinity of the Proposed Development, describes the current baseline air quality conditions, outlines the assumptions regarding the nature, duration and scale of emissions and the predicted effect of emissions on identified sensitive receptors. Rochdale Envelope principles and conservative assumptions have been applied in order to derive a worst-case scenario. Embedded mitigation measures are also included.
Paragraph 5.7.7 states: <i>“The applicant is advised to consult the relevant local planning authority and, where appropriate, the EA about the scope and methodology of the assessment.”</i>	Stockton-on-Tees Borough Council (STBC) and Redcar and Cleveland Borough Council (RCBC) as the local planning authorities and the EA have been consulted at scoping stage; post scoping and have been consulted at the formal (statutory) consultation stage regarding the proposed approach to assessment of air impacts. Their views have been incorporated into the air impact assessment as discussed in Section 8.6.

Paragraph 5.7.8 states: <i>“Mitigation measures may include one or more of the following:</i> • <i>engineering: prevention of a specific emission at the point of generation; control, containment and abatement of emissions if generated</i> • <i>lay-out: adequate distance between source and sensitive receptors; reduced transport or handling of material</i> • <i>administrative: limiting operating times; restricting activities allowed on the site; implementing management plans”</i>	Operational emissions will be controlled and abated in accordance with the relevant BAT, and the conditions contained within the Environmental Permit. The plant design will take into consideration transport distances between storage and operational areas to minimise the potential for impacts to occur. The operational plant will operate 24 hours per day, 7 days per week and will be designed to minimise the potential for impacts as a result of this continuous operation.
Paragraph 5.7.9 states: <i>“Construction should be undertaken in a way that reduces emissions, for example the use of low emission mobile plant during the construction, and demolition phases as appropriate, and consideration should be given to making these mandatory in Development Consent Order requirements.”</i>	The detailed CEMP(s) will ensure that construction activities are carried out to reduce emissions.
Paragraph 5.7.10 states: <i>“Demolition considerations should be embedded into designs at the outset to enable demolition techniques to be adopted that remove the need for explosive demolition.”</i>	A DEMP will be in place prior to decommissioning to control emissions from demolition activities. For demolition activities occurring as part of the construction phase this will be covered in the CEMP (Appendix 5A: Framework Construction Environmental Management Plan, ES Volume III, Application Document Ref. 6.3)
NPS EN-3	
Paragraph 2.7.41 states: <i>“Applicants should assess... emissions of odour as set out in EN-1 Section 5.7, with particular regard to the handling and storage of waste for fuel.”</i>	Odour has not been considered in this assessment due to the lack of nearby sensitive human receptors, however, there are not expected to be any significant operational odour. The potential for odour to occur from the operational Proposed Development will be controlled through the application of BAT and the controls within the Environmental Permit.

- 8.2.59 Whilst the Secretary of State must decide this Application in accordance with any relevant NPS, the National Planning Policy Framework (NPPF) [Ref 44] and Planning Practice Guidance (PPG) are matters the Secretary of State may have regard to where it is important and relevant to their decision.
- 8.2.60 The NPPF was revised and published in August 2026 with the purpose of planning to achieve sustainable development. The NPPF places emphasis on the health effects of air pollution, reducing exposure to poor air quality,

and supporting compliance with relevant air quality limit values, objectives and targets. The following policies are relevant to air quality.

- 8.2.61 Policy TR3 recognises the role of sustainable transport in reducing air pollution and requires the environmental impacts of transport infrastructure to be considered:

Policy TR3: Locating development in sustainable locations

“d. The environmental impacts of traffic and transport infrastructure should be identified, assessed and taken into account – including taking opportunities to avoid or mitigate any adverse environmental effects, and to secure net environmental gains such as reductions in air pollution”

- 8.2.62 Policy P1 of the NPPF sets out how air pollution should be considered in plan-making, including the protection of vulnerable communities and habitats from pollution impacts and opportunities to reduce air pollution and support compliance with objectives and targets:

- 8.2.63 *“a.iii. Development proposals will not cause unacceptable levels of pollution, either alone or in combination with other pollution sources, taking into account communities which may be particularly vulnerable to its effects, such as children and older people, as well as habitats and species which may be vulnerable to pollution”*

“b. Consider any wider opportunities to reduce air, water, soil, noise or other forms of pollution, and contribute to compliance with national and local environmental targets and objectives, through the spatial strategy and policies for specific parts of the plan area (such as by identifying opportunities for strategic nature-based solutions)”

- 8.2.64 Policy P3 recognises the relationship between air quality, health and living conditions, requiring development proposals to consider and minimise occupier and user exposure to poor air quality, prioritise reducing emissions at source alongside achieving compliance with statutory limits:

- 8.2.65 *Policy P3: Living conditions and pollution*

“1. Development proposals should be appropriate for their location, taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, whether these effects are on or off-site; and whether this is as a result of the development itself or the product of preexisting conditions in its vicinity. In assessing the potential effects of pollution, consideration should be given to the potential sensitivity of the site, and its intended occupiers and users, as well as that of the environment and population in the surrounding area (including where

certain groups could be particularly vulnerable to its effects, such as children and older people).

2. Within this context development proposals should:

a. Provide healthy living conditions for occupiers and users in terms of adequate access to light and avoiding exposure to levels of air, noise, artificial light or other sources of pollution which could have an unacceptable adverse effect on health and the quality of life. Where necessary suitable mitigation measures should be incorporated to secure acceptable living conditions;

b. Not give rise to, or contribute to, an unacceptable level of access to daylight and sunlight for neighbouring residents and occupiers, or unacceptable levels of air, noise, artificial light, water, soil or other forms of pollution on or beyond the site. Adverse impacts of this nature should be avoided where possible, or else mitigated to an acceptable degree. Where possible, opportunities should be taken to reduce pollution affecting the wider area (such as through traffic and travel management or improved external lighting);

c. Sustain and contribute to compliance with relevant limit values or national objectives and targets for air pollutants including PM_{2.5}. Development proposals should take account of Air Quality Management Areas and be consistent with the objectives of relevant Air Quality Action Plans, Clean Air Plans and Local Air Quality Strategies;

[...]

3. In applying this policy, it should be assumed, unless there is clear evidence to the contrary, that separate regulatory regimes for the control of pollution will operate effectively, as set out in policy DM7. This means that it will be appropriate to take into account emissions limits set through those other regimes.”

- 8.2.66 The Planning Practice Guidance (PPG) on Air Quality was updated on 1 November 2019 [Ref 46], with specific reference to air quality. The PPG states that the planning system should consider the potential effect of new developments on air quality where relevant limits have been exceeded or are near the limit. Concerns also arise where the development is likely to adversely affect the implementation of air quality strategies and action plans and/or, in particular, lead to a breach of EU legislation (including that applicable to wildlife). In addition, dust can also be a planning concern, for example, because of the effect on local amenity.

8.2.67 When deciding whether air quality is relevant to an application, the PPG states that a number of factors should be taken into consideration including if the development will:

“Lead to changes (including any potential reductions) in vehicle-related emissions in the immediate vicinity of the proposed development or further afield. This could be through the provision of electric vehicle charging infrastructure; altering the level of traffic congestion; significantly changing traffic volumes, vehicle speeds or both; or significantly altering the traffic composition on local roads. Other matters to consider include whether the proposal involves the development of a bus station, coach or lorry park; could add to turnover in a large car park; or involve construction sites that would generate large Heavy Goods Vehicle flows over a period of a year or more”;

“introduce new point sources of air pollution. This could include furnaces which require prior notification to local authorities; or extraction systems (including chimneys) which require approval under pollution control legislation or biomass boilers or biomass-fuelled Combined Heat and Power (CHP) plant; centralised boilers or CHP plant burning other fuels within or close to an air quality management area or introduce relevant combustion within a Smoke Control Area”;

“expose people to existing sources of air pollutants. This could be by building new homes, workplaces or other development in places with poor air quality”;

“give rise to potentially unacceptable impact (such as dust) during construction for nearby sensitive locations”; and

“have a potential adverse effect on biodiversity, especially where it would affect sites designated for their biodiversity value.”

8.2.68 Regarding how detailed an air quality assessment needs to be, the PPG states:

“Assessments need to be proportionate to the nature and scale of development proposed and the potential impacts (taking into account existing air quality conditions), and because of this are likely to be locationally specific.”

8.2.69 Defra’s Clean Air Strategy [Ref 47] was published in 2019 and sets targets for improving air quality across the country. It includes actions for reducing emissions from various sources, such as transport, domestic activities, farming and industry. There is also a long-term target for reducing population exposure to PM_{2.5} concentrations to meet the World Health

Organisation's (WHO) target of $10\mu\text{g}/\text{m}^3$ as an annual mean. In particular, the Clean Air Strategy states:

“New legislation will create a stronger and a more coherent framework for action to tackle air pollution. This will be underpinned by new England-wide powers to control major sources of air pollution, in line with the risk they pose to public health and the environment, plus new local powers to take action in areas with an air pollution problem. These will support the creation of Clean Air Zones to lower emissions from all sources of air pollution, backed up with clear enforcement mechanism.”

Local planning policy context

8.2.70 In relation to the determination of the Application for the Proposed Development, the Secretary of State is likely to take into consideration local planning policy. Relevant local planning policy to the Proposed Development is listed below. For detail as to the Applicant's compliance with the relevant local policy, please see the **Policy Compliance and Accordance Tables (Application Document Ref. 5.2.2)**.

8.2.71 The majority of the Main Site of the Proposed Development is located on the land of the former INEOS Nitriles site, within the area covered by STBC. The access and utility corridors aspects of the Proposed Development are also predominantly located within the same Borough but also extend across the River Tees into the RCBC area.

Stockton-on-Tees Borough Council local plan

8.2.72 The STBC Local Plan [Ref 48] was adopted in January 2019 and covers the key policies for determining planning applications. The Local Plan sets STBC's policies and proposals to guide planning decisions and establishes the framework for the sustainable economic growth and development of the Borough up to 2032.

8.2.73 Policy ENV7 relates to Ground, Air and Water Quality and states that:

“All development proposals that may cause groundwater, surface water, air (including odour), noise or light pollution either individually or cumulatively will be required to incorporate measures as appropriate to prevent or reduce their pollution so as not to cause unacceptable impacts on the living conditions of all existing and potential future occupants of land and buildings, the character and appearance of the surrounding area and the environment.

Development that may be sensitive to existing or potentially polluting sources will not be sited in proximity to such sources. Potentially polluting development will not be sited near to sensitive developments or areas unless satisfactory mitigation measures can be demonstrated.

Where development has the potential to lead to significant pollution either individually or cumulatively, proposals should be accompanied by a full and detailed assessment of the likely impacts. Development will not be permitted when it is considered that unacceptable effects will be imposed on human health, or the environment, taking into account the cumulative effects of other proposed or existing sources of pollution in the vicinity. Development will only be approved where suitable mitigation can be achieved that would bring pollution within acceptable levels.”

Stockton-on-Tees Borough Council Air Quality Strategy

8.2.74 The STBC Air Quality Strategy [Ref 49] was produced in 2025 and aims to link this strategy with existing national, regional and local strategies. In the strategy, STBC have outlined five key areas as a priority for maintaining and improving good levels of air quality throughout the Borough:

- monitoring, reporting and increasing awareness of air quality;
- strategic measures to improve air quality levels;
- reduce emissions from vehicles;
- reduce emissions from domestic and agricultural sources; and
- new developments, construction and planning.

Stockton-on-Tees Borough Council plan 2024 - 2028

8.2.75 Within the STBC Plan 2024 – 2028 [Ref 50], Priority 3: ‘A Great Place to Live, Work and Visit’ lists air quality as an area to improve under one of the ‘key moves’ with the guidance – “a great place to live and call home”. The 2024 – 2028 plan lists ‘key moves’ as a set of inter-connected priorities to be delivered to overcome the challenges of the Borough and achieve STBC’s vision for their communities.

8.2.76 The plan states that STBC will:

“Take advantage of opportunities to make best use of green space, improve energy efficiency and air quality. This will include working with developers and other partners to influence design and delivery, as well as raising awareness about the health impacts of poor air quality and promoting behaviours that can have a positive impact.”

Stockton-on-Tees Borough Council joint health and wellbeing strategy 2025 - 2030

8.2.77 Focus Area 3: ‘Everyone lives in healthy and sustainable places and communities’ of the STBC Joint Health and Wellbeing Strategy 2025 – 2030 [Ref 51] lists air quality as one the key commitments and states:

“We will reduce air pollution by working with partnerships and networks to influence policy and planning decisions. Increase awareness by providing

education on the health impacts of poor air quality and promoting behaviours that improve air quality, with a particular focus on areas and communities that experience the worst air quality.”

Environmental sustainability and carbon reduction strategy 2022 - 2023

- 8.2.78 The Environmental Sustainability and Carbon Reduction Strategy 2022 – 2023 [Ref 52] provides the strategic aims and objectives of STBC for environmental sustainability and carbon reduction. It is split into four different aims, with Aim 2: Protect and Enhance the Natural Environment featuring a focus on improving air quality by reducing harmful emissions as part of objective 2b.
- 8.2.79 Under Objective 2b. Help to improve air quality by reducing harmful emissions it states that this should include:
- continuing to monitor local air quality to ensure that legal National Air Quality Standards are not exceeded; interventions to improve local air quality where appropriate such as no idling zones, reduced speed limits and no parking zones near to education facilities; and raising awareness of air quality issues and encouraging residents businesses and other organisations to take positive action to minimise harmful emissions.

Redcar and Cleveland Borough Council local plan

- 8.2.80 The RCBC Local Plan [Ref 53] was formally adopted in May 2018. Under the overarching principle of sustainability and design within the Local Plan it states that sustainable development can be characterised by a development that:
- makes the best use of resources, including land;
 - reduces the need to travel;
 - protects and enhances biodiversity and geodiversity;
 - achieves sustainable levels of economic growth;
 - maintains good levels of air quality; and
 - minimises the risk of flooding.

- 8.2.81 The local plan also aims to promote and maximise the role of green infrastructure in mitigating and adapting to climate change, providing solutions for issues such as air quality, flood risk, coastal changes and loss of habitats.

South Tees clean air strategy

- 8.2.82 The South Tees Clean Air Strategy [Ref 54] was produced in February 2024 by RCBC in collaboration with Middlesbrough Borough Council (MBC). The

strategy aims to raise awareness of the importance of air pollution, setting out how each Council will maintain and improve air quality in collaboration with partners and their local communities.

8.2.83 The strategy outlines five workstreams for sustainable air quality improvements:

- planning for cleaner air (data and intelligence);
- reduce vehicle emissions and promotion of active travel (alternative fuel/modal shift);
- raise awareness of air quality (communications/engagement and awareness raising);
- educate to improve indoor air quality; and
- enforcement.

8.2.84 Through this dynamic strategy, work will be regularly reviewed with partners to ensure that it remains relevant to the delivery of the South Tees Strategy. Implementation and progress with the South Tees Clean Air Strategy requires collaborative working with internal teams and external organisations to improve the air for all within the South Tees area.

Other guidance

8.2.85 Defra has published policy guidance LAQM PG(22) [Ref 55] and technical guidance LAQM TG(22) [Ref 56] to assist local authorities in fulfilling their duties in relation to LAQM. Parts of this guidance, and associated tools, are also useful in assessing the impacts of individual developments within the planning process.

8.2.86 The Environment Protection UK (EPUK) and Institute of Air Quality Management (IAQM) Land-use Planning and Development Control: Planning for Air Quality guidance [Ref 57] has been used to screen potential traffic air quality impacts to determine those impacts that may require more detailed assessment, and in the assessment of traffic air quality effects and the evaluation of significance.

8.2.87 The IAQM has published several other guidance documents relating to the potential effects of dust generation during construction works and development control including:

- Guidance on the assessment of dust from demolition and construction v2.2 [Ref 58]; and
- Guidance on the assessment of mineral dust impacts for planning version 1.1 [Ref 59].

8.2.88 In addition, IAQM have also published a guide to the assessment of air quality impacts on designated nature conservation sites [Ref 24].

8.3 [Assessment methodology and significance criteria](#)

[Statutory Consultation](#)

8.3.1 A scoping consultation was undertaken with statutory consultees with responses from the consultation received from PINS on 11 November 2025.

8.3.2 In addition, the Statutory Consultation following publication of the Preliminary Environmental Information Report (PEIR) was undertaken between 2 December 2025 and 13 January 2026. Table 8.9 provides the detail of the scoping responses and the responses to Statutory Consultation, and how they have been addressed in this ES.

8.3.3 Further targeted consultation was carried out in June 2026, however no further comments on air quality were received.

Table 8.9 Statutory Consultation responses and comments

Consultee or organisation approached	Date and nature of consultation	Summary of responses	How comments have been addressed in this chapter
PINS	Scoping Opinion - 11 th November 2025	The Inspectorate observes the table that sets out the “elements scoped in or out of further assessment” that is presented in the other aspect chapters of the Scoping Report has been omitted from the air quality chapter.	The ES chapter clearly sets out what has been scoped in and out of the Air Quality assessment.
		Questioned the use of a 15km study area for Local Authorities that do not lie adjacent to the proposed development	The 15km scoping radius is in relation to potential impacts at ecological receptors only, in line with EA Guidance Risk Assessment on “large emitters” [Ref 15].
		Stated that the assumption that significant impacts from combustion activities do not occur beyond the proposed 2km study area for human receptors was not appropriately justified.	A 2km study area for operational impacts has been selected based on industry standard / good practice. This is also demonstrated by the results of the Operational modelling presented in Section 8.6 of this Chapter.
		Noted an expectation for there to be a Construction Environmental Management Plan (CEMP) for dust mitigation measures.	A framework CEMP (fCEMP) has been submitted with the Application (see Appendix 5A: Outline Construction Environmental Management Plan, ES Volume III, Application Document Ref. 6.3)
		Inter-and intra-project cumulative effects need to be considered within a cumulative assessment.	A cumulative assessment of inter-project cumulative air quality effects is provided in Chapter 22: Cumulative and Combined Effects (ES Volume I, Application Document Ref. 6.1) .
		The applicant's attention is drawn to the Defra advice 'PM2.5 Targets: Interim Planning Guidance'.	Noted and has been taken into account in the assessments carried out in the ES.

Consultee or organisation approached	Date and nature of consultation	Summary of responses	How comments have been addressed in this chapter
		Novel technologies, process and pollutants – receptor pathways and the need to assess all pollutants and pathways.	Operational emissions to air from the operational Proposed Development have been identified and assessed.
		Odour assessment	No odour assessment has been carried out. It is considered that appropriate emission abatement measures, in line with BAT and the requirements of the Environmental Permit will be in place to ensure that significant odour does not extend beyond the boundary as a result of operation of the Proposed Development.
		Dispersion modelling of construction vehicles and marine traffic.	Construction and operational traffic and marine movement numbers have been provided and screened against the relevant criteria. Modelling has been carried out and is detailed in Appendix 8A: Construction Air Quality Assessment (ES Volume III, Application Document Ref. 6.3) .
		Consideration of construction impacts from NRMM.	A qualitative assessment of NRMM is provided in paragraphs 8.6.31 to 8.6.34 of this Chapter.
Durham Council	Scoping Opinion - 11 th November 2025	No concerns raised over the proposed assessment of air quality impacts.	Noted
Natural England	Scoping Opinion - 11 th November 2025	Guidance provided on the assessment of air quality impacts to the Teesmouth and Cleveland SSSI Sand Dune Habitat	The additional guidance is noted and the relevant critical load range for the assessment of Nitrogen Deposition has been used in the assessment at the lower end of the range at this time.
Natural England	Statutory Consultation – 13 January 2026	Justification is needed for excluding operational road traffic and construction and operational shipping emissions.	Operational traffic numbers had been below the required EPUK/IAQM screening criteria [Ref 57] at PEIR stage. However, increases in

Consultee or organisation approached	Date and nature of consultation	Summary of responses	How comments have been addressed in this chapter
			operational traffic numbers assessed in the ES has resulted in these now being above the screening criteria, and therefore a detailed dispersion modelling assessment has now been carried out for operational traffic. Limited information was available on the construction and operational shipping movements at the PEIR stage. However, more detail is now available which has allowed for an assessment to be undertaken and is detailed in Appendix 8B: Operational Air Quality Assessment (ES Volume III, Application Document Ref. 6.3).
		Methodology for identifying the affected road network (ARN) is unclear – Appendix 8A indicates a threshold of 500 Annual Average Daily Traffic (AADT)/100 HDV AADT is used, but this does not indicate that impacts of >1% of relevant critical loads/levels would be avoided where smaller traffic flows are predicted. Appendix 8A para 4.2.3 states “Additional roads where the screening criteria were not exceeded were included in the assessment to provide a wider assessment of local emissions to air”, but it is not clear which roads were considered.	The Affected Road Network (ARN) was determined using the EPUK/IAQM screening criteria for sites not within or adjacent to an AQMA [Ref 57], as is standard practice. Additional roads were included in the construction traffic model for the purposes of verification, in line with TG(22) [Ref 56]. This resulted in the inclusion of Marsh House Avenue and Haverton Hill Road so that the roadside diffusion tubes located on these roads could be included in the model. Two additional roads were included to provide complete traffic information at junctions and roundabouts. One was the A178 Seaton Carew Road north of the Seaton Carew Roundabout, whilst the other was the Newport Bridge Approach Road. These were selected due to

Consultee or organisation approached	Date and nature of consultation	Summary of responses	How comments have been addressed in this chapter
			the location of sensitive ecological receptors within 200m of the ARN.
		Study area for assessments areas generally acceptable. However, the use of 200m for NRMM would not necessarily capture emissions from e.g. generators for the proposed 3-4yr construction period. Provide justification or a wider study area for generator emissions. This would require consideration of impacts at the Teesmouth protected sites.	The IAQM guidance has been used to determine appropriate study areas and 250m (rather than the 200m stated) was used in the assessment in line with this best practice guidance. In line with the IAQM guidance, the use of diesel or petrol powered generators should be avoided, which is listed in the mitigation measures in section 8.7 of this chapter. Any NRMM employed will use low sulphur fuels and are likely to be <1MWth in size. Additionally, such plant would only be operated intermittently, not continuously and therefore the operational hours of such plant would be unlikely to affect critical levels and loads which are set on an annual basis.
		The assessment must assume the worst case for each parameter – e.g. if different receptors will be impacted at different points in the construction process, not just the busiest construction year (2029 – Ch 8 - 3.1.73).	The peak construction year represents the worst case AADT throughout the full construction programme and therefore is considered to be representative of the worst case for all receptors.
		NO _x and NH ₃ concentrations have been modelled at a concentration lower than the BAT-AEL to take account of additional technologies. However, the PEIR states that the use of these additional technologies would be subject to a cost/benefit appraisal and so it is not certain that they will be included in the final development. The modelling of NO _x and NH ₃ will	The Operational Plant assessment for the Proposed Development (Appendix 8B: Operational Air Quality Assessment (ES Volume III, Application Document 6.3)) has been presented at the BAT-AELs in the ES, with the potential for significant effects predicted at the closest Teesmouth and Cleveland Coast ecological site (annual mean

Consultee or organisation approached	Date and nature of consultation	Summary of responses	How comments have been addressed in this chapter
		underestimate impacts if these additional technologies are not adopted.	NO_x, nitrogen deposition and acid deposition impacts only). Embedded mitigation, including the use of low-NO_x burners and SNCR/SCR is required to control the emissions of NO_x to the required BAT-AELs. The use of SNCR/SCR results in an additional emission of NH₃ slip which could require additional abatement. This could include additional SNCR/SCR (to further reduce NO_x) and wet scrubbing (to further reduce NH₃). These measures may be required to reduce the impacts of annual mean NO_x concentrations, acid deposition and nutrient nitrogen deposition at the closest and worst-case ecological site (Teesmouth and Cleveland Coast). An additional modelling scenario at the lower NO_x and NH₃ emission concentrations has also been presented. This predicted significant reductions in annual mean NO_x, nutrient nitrogen deposition and acid deposition in comparison to at the BAT-AELs, with overall effects determined to be not significant following the additional mitigation. It is considered that the use of additional technologies to reduce emissions beyond the BAT-AELs would be additional mitigation. Such additional mitigation would be subject to a BAT Assessment and Cost Benefit Analysis (CBA) that would be required to support the Environmental Permit application for the operational Proposed Development.

Consultee or organisation approached	Date and nature of consultation	Summary of responses	How comments have been addressed in this chapter
		Location of sensitive sand dune features within the Teesmouth and Cleveland Coast SSSI. Natural England advises that there is a small area of sand dunes located here: X: 453568 Y: 525467.	As part of the assessment, an ecological receptor has been placed at this location to account for any depositional impacts on the site.
		It is noted that the lowest point of the nitrogen deposition critical load for the sand dunes at Teesmouth must be used in the assessment (5kgN/ha/yr) – a higher critical load of 10kgN/ha/yr appears to have been used in this PEIR assessment (e.g. Table 4.5 in Appendix 8A)	A nitrogen deposition minimum critical load of 5kgN/ha/yr has been used in the assessment for the identified dune habitats at Teesmouth and Cleveland Coast ecological site for the operational assessment at ES.
		It is incorrectly stated that Natural England consider impacts that are below 1% of the relevant critical load for a site can be regarded as insignificant. This is an in-combination threshold – not the level generated by the project alone. It is therefore inappropriate to exclude such impacts from further assessment where the project alone generates <1%.	The significance criteria applied to the assessment from the EA Risk Assessment Guidance [Ref 15] is based on this threshold. In order to quantify impacts, this threshold has been used for the assessment.
		Daily NOx threshold – the use of 200µg/m ³ is acceptable as long as evidence is provided that both SO ₂ and O ₃ are below their relevant critical levels in the area (evidence for SO ₂ is provided, but not ozone)	SO ₂ and O ₃ concentrations in the vicinity of the Proposed Development are below the relevant critical levels. In 2024, a maximum AOT40 value of 2,777µg/m ³ ·h was reported in the vicinity of the Proposed Development (within STBC authority area) as reported on the UKAIR Dataset (Ozone AOT40 Long Term Objective 2024 – Compliance Status by Local Authority) [Ref 61]. This falls below the long-term objective for ozone for the protection of vegetation AOT 40 of 6,000µg/m ³ ·h (May to July). The maximum predicted Defra background annual mean SO ₂ concentration within the Main

Consultee or organisation approached	Date and nature of consultation	Summary of responses	How comments have been addressed in this chapter
			Site area was $7.9\mu\text{g}/\text{m}^3$ in 2024, which is also below the critical level of $20\mu\text{g}/\text{m}^3$. Therefore, use of the higher daily NO_x threshold of $200\mu\text{g}/\text{m}^3$ at ecological receptors has been deemed appropriate in this assessment.
		The construction phase air quality assessment shows that the critical load for nitrogen deposition is being exceeded at 22 receptor locations and that the construction emissions from this project would contribute greater than 1% of the critical load.	The 22 receptors related to points on a transect for the ecological receptors selected. The locations are related to distance from the road where the impacts were greater than 1% of the critical load. Where this occurs, it is only for locations situated closest to the road and have been reviewed by the Applicant's ecologist to determine that although they are considered part of the designation they are likely to be areas where the designated habitat is not present. Equally, the impacts of construction traffic can be considered temporary, as it generally takes long term deposition for impacts to be realised. The discussion of results in the ES has taken this into account.
		It is not clear how the critical levels and critical loads for the habitats have been identified – for example, the Critical loads identified for the Teesmouth sites in Table 5.9 in Appendix 8B (operational assessment) are different to those adopted in Table 4.5/4.13 of Appendix 8A (construction traffic assessment) – relevant habitat should be listed. In addition, it is unclear why the ammonia critical level of $3\mu\text{g}/\text{m}^3$ (where lichens or bryophytes are not integral to a habitat) has been used at some sites, when APIS indicates they could be integral in some cases.	The critical loads applied to the assessments are the most relevant to the receptor locations identified for the construction and operational assessments, and therefore this may be different based on the receptor location and the habitat present. The critical loads used in the assessment have been reviewed for the ES and are more clearly detailed in the relevant assessments.

Consultee or organisation approached	Date and nature of consultation	Summary of responses	How comments have been addressed in this chapter
		Use of Design Manual for Roads and Bridges (DMRB) LA105 in construction traffic assessment – this methodology is not sufficiently robust to be able to exclude protected sites from further assessment. For example, nitrogen deposition is only considered when NO _x is >0.3µg/m ³ , which will mean it is not calculated in circumstances where 1% of the NO _x critical level is not exceeded. It also does not take account of ammonia and does not acknowledge any impacts not resulting in “loss of one species”. It does not appear this approach has been used in the assessment, but this should be confirmed.	Section 8.3 notes that the EPUK/IAQM screening criteria was used [Ref 57], which are much more stringent than the DMRB criteria. Nitrogen deposition has been calculated for all receptors and ammonia has been included as a pollutant in its own right (for comparison against the relevant critical level) and in the nitrogen deposition calculations.
		Construction traffic – note Tables 4.11/4.12 in Appendix 8A do not provide an estimated PEC at each receptor, to allow confirmation that the assessment conclusion that PEC would be less than the critical level is correct. In Table 4.13 – CE003 is missing.	The results tables in Appendix 8A: Construction Air Quality Assessment (ES Volume III, Application Document 6.3) for construction traffic have been updated to include the Predicted Environmental Contribution (PEC) in this ES. All receptors have been included in the results tables.
Stockton-on-Tees Borough Council	PEIR Consultation – 8 January 2026	It is noted that the operational assessment details that annual mean levels of arsenic are likely to cause a minor impact at Seaton Carew (Paragraph 6.2.8); the report concludes in table 6-1 that due to the levels being below the AQAL the impact is insignificant.	Using the EPUK/IAQM impact descriptors, a minor adverse impact was predicted at R002 Seaton Carew. It should however be noted that As has been modelled at the BAT-AEL for other metals, assuming the whole emission is as Arsenic (As). Further justification has been provided for the insignificant impact in Appendix 8B to show that As emissions are likely to comprise a maximum of 5% of the BAT-AEL for 'other metals' and

Consultee or organisation approached	Date and nature of consultation	Summary of responses	How comments have been addressed in this chapter
			therefore on this basis the actual impacts would be <1% of the AQAL.
		Cr(VI) is predicted as a major adverse impact at all human receptors (Paragraph 6.2.9) and the report details that no monitoring of this pollutant within close proximity to the site has been undertaken and that background levels have been taken from Scunthorpe. Despite table 6-1 concluding that the impact will be Not Significant, given the information provided I am concerned about the potential impact at this time and I would therefore request background levels to be monitored to establish the full impact of this proposal when compared to representative levels.	A background annual mean Cr(VI) concentration of 0.0006µg/m ³ has been derived from the UK Heavy Metals Network data (Scunthorpe sites, 2018 – 2025), assuming Cr(VI) = 20% of total chromium, which is considered precautionary. Further justification has been provided for the insignificant impact in Appendix 8B to show that Cr(VI) emissions are likely to comprise a maximum of 0.03% of the BAT-AEL for 'other metals' and therefore on this basis the actual impacts would be significantly <1% of the AQAL and therefore the impacts are considered to be insignificant.
		The report does not detail mitigation measures for construction dust as section 8.1.1 has a missing reference, so mitigation measures have not been assessed. It has also not been possible to view Appendix 8A – Construction Air Quality Assessment as access to appendix is not possible at this time.	Mitigation measures have been derived in line with the IAQM best practice guidance [Ref 58] and are detailed in Section 8.7 and Appendix 8A (ES Volume III, Application Document Ref. 6.3)
		As the proposal is likely to be subject to an Environmental Permit, to ensure the air quality levels approved as part of the permit process it is recommended the condition below is applied: Prior to operation, the operator shall submit evidence of compliance with the Environmental Permit issued by the Environment Agency, including dispersion modelling results.	An Air Quality Impact Assessment will be submitted with the Environmental Permit application that will be made for the operation of the Proposed Development. Once operational, the Applicant will be required to carry out continuous emissions monitoring on the main emission points, and periodic monitoring on other points to demonstrate compliance with the Environmental Permit. The

Consultee or organisation approached	Date and nature of consultation	Summary of responses	How comments have been addressed in this chapter
			Applicant does not consider it is necessary to submit further evidence to the Council, as this is controlled through the environmental permitting regime.
Durham County Council	PEIR Consultation – 6 January 2026	Given the Proposed Developments location in the neighbouring borough and its distance (approximately 23km) from County Durham, it is not anticipated that the Proposed Development would have a direct or indirect impact on the environment or amenity of County Durham's residents. The air quality assessment has modelled the impact of emissions from the stacks at receptors up to 4.3km away at locations thought to be representative of nearby towns and villages. The resultant concentrations of pollutants would be within current environmental standards for the protection of human health. Given the increased dispersion that would occur before pollutants reached County Durham, possible impacts would be diminished further. Although receptors in County Durham have not been explicitly modelled, conformance with environmental standards for receptors closer to the source will mean that suitable levels will also be achieved inside the County Durham boundary.	The consultation response from Durham County Council is noted. It is unlikely that there will be significant impacts on receptors in County Durham due to the distance between the Proposed Development and the County borders. This is demonstrated through the results of the dispersion modelling for construction traffic, operational traffic and operational plant. Should there be any significant changes to the project and the Proposed Development the impacts will be reassessed, and this will inform if there are likely to be impacts on County Durham.
Forestry Commission	PEIR Consultation – 13 January 2026	Trees absorb gaseous pollutants (e.g., NO ₂ , O ₃ etc) through their leaf pores (stomata) and intercept particulate matter on leaf surfaces. This uptake can improve local air quality and reduce pollutant concentrations in the vicinity of forests. Particulates and associated heavy metals or toxic compounds can	An assessment on sensitive ecological receptors has been undertaken for construction dust, construction traffic (roads and shipping), operational traffic (road and shipping) and operational plant with the outcome of this

Consultee or organisation approached	Date and nature of consultation	Summary of responses	How comments have been addressed in this chapter
		transfer from leaves to soils during rainfall, potentially affecting soil chemistry. Nitrogen and acid deposition (from NO_x, NH₃, acidic particles) can harm woodland soils, change nutrient balances, and disrupt ecological communities. Air pollutants like ozone can damage foliage, reduce photosynthesis, and weaken trees' growth and resilience. The planting of significant numbers of trees, and the creation of new woodlands, should be incorporated into the mitigation plan for the project, due to the positive impacts of trees on local air quality. Due to the presence of irreplaceable ancient woodland habitats within approximately 5km of the project order limits, the planting of trees close to the project should be considered, to reduce potential air quality impacts on those habitats. Species such as lichens and bryophytes (common in ancient woodlands) are particularly sensitive to air quality changes because they derive nutrients directly from the air, not soil. Changes in air pollutant levels can shift their abundance and composition. Lichens, bryophytes, and other ancient woodland flora and fauna, should all be specifically considered, when assessing sensitive receptors. Ancient woodlands are among the UK's most ecologically sensitive habitats—they often harbour specialist species that respond to air quality changes differently than general vegetation. Deposition impacts on bark pH, lichens, fungi, and soil nutrient cycling can be significant even where air pollutant levels are well below human health thresholds. Trees and ancient woodlands experience chronic deposition effects even	assessment detailed in Section 8.6, with mitigation measures suggested in Section 8.7. No Ancient Woodlands were identified within 2km of the Proposed Development, which is the study area outlined in the EA risk assessment methodology [Ref 15]. Beyond this distance it is assumed that the impacts would be negligible. Therefore, as there are no Ancient Woodlands within 2km of the Proposed Development it can be assumed that the impacts would be negligible. The planting of trees can be considered as being beneficial to air quality by enhancing or reducing dispersion. However, they are unlikely to be as effective with controlling emissions at source. Therefore, the mitigation measures detailed in Section 8.7 are likely to be more effective. The magnitude of the reduction in concentration by realistic planting schemes, using trees, is small and in the range 2% to 10% for primary PM₁₀ and ambitious plantings [Ref 60] For NO₂, vegetation is not a very efficient sink, and as the deposition occurs in daytime, and primarily in the warmer months, there is little benefit for air quality for most of the time that NO₂ is a problem [Ref 60].

Consultee or organisation approached	Date and nature of consultation	Summary of responses	How comments have been addressed in this chapter
		at low pollutant concentrations (e.g., nitrogen and acid inputs), which can alter soil chemistry and plant community composition over years, decades and beyond. They can act as sinks that accumulate pollutants in biomass and soil, with possible knock-on ecological effects that aren't fully captured by assessments based on "routine emissions". Even if a single facility's emissions are within legal air quality limits, cumulative effects from multiple sources (industrial clusters, vehicles, agriculture) and long-term deposition might worsen "critical load" exceedances in woodlands. Many UK woodlands already exceed critical nitrogen deposition loads, for example.	

Overview

- 8.3.4 Details of the assessment methodologies are provided within **Appendix 8A: Construction Air Quality Assessment** and **Appendix 8B: Operational Air Quality Assessment (ES Volume III, Application Document Ref. 6.3)**.
- 8.3.5 The individual technical assessments provide detailed descriptions of the sensitive human receptors used in the assessment, the ecological receptors and the methodology for assessing the impacts of construction dust, construction traffic, operational traffic and the operational stack emissions of the Proposed Development.

Study area

- 8.3.6 The study areas for the assessments have been defined according to the appropriate guidance for the type of assessment being carried out (i.e. construction dust and NRMM, traffic, shipping and the operational Proposed Development) and therefore vary for the individual assessment methodologies. Figures showing the relevant study areas are provided in **Figure 8.2 to Figure 8.5 (ES Volume II, Application Document Ref. 6.2)**.
- 8.3.7 The study area for the construction dust and NRMM emissions has been applied in line with IAQM guidance [Ref 58], extending:
- up to 250m beyond the Proposed Development and 50m from the construction traffic routes (up to 250m from the site entrance), for human health receptors; and
 - up to 50m from the Proposed Development and construction traffic route (up to 250m from the site entrance) for ecological receptors.
- 8.3.8 The study area for the traffic assessment is defined in the screening criterion set out in the EPUK/IAQM guidance [Ref 57], which states that only properties and habitat sites within 200m of affected roads (roads that experience a change in traffic flow above the EPUK/IAQM criteria (outlined in Section 8.3) should be considered in road traffic emissions assessments.
- 8.3.9 The study area for the shipping assessment has been defined as the length of the River Tees from the mouth of the river towards the Proposed Development's quay area to account for sources of emissions and manoeuvring vessels. In line with TG(22) [Ref 56] sensitive human receptors were screened up to a distance of 1km from the defined shipping route and quay area. Specific guidance does not exist for selecting ecological receptors when assessing the impacts from shipping. In lieu of bespoke guidance, TG(22) [Ref 56] was used to determine sensitive ecological receptors within 1km of the defined shipping route and quay area.

- 8.3.10 The study area for the Main Site operational point source emissions extends up to 15km for ecological receptors, in line with the EA risk assessment methodology [Ref 15] and includes:
- SPA, SAC, Ramsar sites and Sites of Special Scientific Interest (SSSI) within 15km; and
 - Local Nature Sites (including ancient woodlands, Local Wildlife Sites (LWS) and National and Local Nature Reserves (NNR and LNR)) within 2km.
- 8.3.11 In terms of human health receptors, the predicted impacts have been reported at the nearest human health receptors to the Main Site, and therefore the study area has been selected accordingly.

[Impact assessment methodology](#)

- 8.3.12 The potential emissions to air from construction and operation of the Proposed Development have been determined or estimated, and key local receptors have been identified, together with the current local ambient air quality. The predicted air quality effects of eventual decommissioning of the Proposed Development including dust and traffic movements are considered to be comparable to those assessed for construction activities. The potential pollutant concentrations resulting from the emissions arising from the construction and operational phases of the Proposed Development have been predicted using atmospheric dispersion modelling techniques where appropriate, which enabled the assessment of the impacts associated with the Proposed Development on the existing local ambient air quality and in particular on the identified sensitive receptors. The assessment methodology for each type of emission is outlined below, with further detail being provided in the accompanying technical appendices (**Appendix 8A: Construction Air Quality Assessment** and **Appendix 8B: Operational Air Quality Assessment, ES Volume III, Application Document Ref. 6.3**).
- 8.3.13 The process and traffic emissions assessments are made with reference to the relevant AQAL in Table 8.1 to Table 8.3 in Section 8.2 of this Chapter.
- Construction phase*
- 8.3.14 As described in **Chapter 5: Construction Programme and Management (ES Volume I, Application Document Ref. 6.1)**, subject to being granted development consent and following a Final Investment Decision (FID), it is anticipated that the construction could commence in 2028 and could last approximately three to four years, concluding with a period of commissioning in 2030/2031.
- 8.3.15 The key stages of the construction programme are currently expected to be:

- 2028 – Preliminary Works, site establishment, site preparation, commencement of quay construction, commencement of civils works;
- 2029 - 30 – site preparation, civils works, construction of the Sustainable Aviation Fuel (SAF) production facility, Combined Heat and Power (CHP) plant and infrastructure including utilities; and
- 2030 - 2031 – mechanical installation and commissioning.

Construction dust

- 8.3.16 The movement and handling of soils and spoil during construction activities for the Proposed Development is anticipated to lead to the generation of some short-term airborne dust. The occurrence and significance of dust generated by earth moving operations is difficult to estimate and depends heavily upon the meteorological and ground conditions at the actual time and location of the work, and the nature of the activity being carried out.
- 8.3.17 At present, there are no statutory UK or EU standards relating to the assessment or control of dust. The emphasis of the regulation and control of demolition/construction dust, therefore, is through the adoption of Best Practicable Means (BPM) when working on site to mitigate any potential impacts. It is intended that the potential for significant adverse environmental effects is avoided at the design stage and through embedded mitigation where possible, including the use of good working practices to minimise dust formation which is detailed further in Mitigation and Enhancement Measures Section of this Chapter (Section 8.7).
- 8.3.18 The IAQM provides guidance for good practice and for qualitative assessment of risk of dust emissions from construction and demolition activities [Ref 58]. The guidance considers the risk of dust emissions from unmitigated activities to cause human health impacts (associated with PM₁₀), dust soiling impacts, and ecological impacts (such as physical smothering, and chemical impacts for example from deposition of alkaline materials). The appraisal of risk is based on the scale and nature of activities and on the sensitivity of receptors, and the outcome of the appraisal is used to determine the level of good practice mitigation required for adequate control of dust.
- 8.3.19 The assessment to determine the impacts of earthworks, demolition, construction and trackout has been undertaken in line with the IAQM guidance [Ref 58]. The guidance outlines the following steps for assessment:
- identify receptors within the appropriate study area for the Proposed Development;

- identify the magnitude of impact through consideration of the scale, duration and location of activities being carried out (including demolition, earthworks, construction and trackout, where construction vehicles could carry mud onto the public highway);
 - establish the sensitivity of the area through determination of the sensitivity of receptors and their distance from construction activities;
 - determine the risk of significant impacts on receptors occurring as a result of the magnitude of impact and the sensitivity of the area, assuming no additional mitigation (beyond the identified development design and impact avoidance measures) is applied;
 - determine the level of additional mitigation required based on the level of risk, to reduce potential impacts at receptors to insignificant or negligible; and
 - summarise the potential residual effects of the mitigated works.
- 8.3.20 The criteria for assessment of magnitude, sensitivity, and risk for construction dust are summarised in Tables 3.1 to 3.7 in **Appendix 8A: Construction Air Quality Assessment (ES Volume III, Application Document Ref. 6.3)**.

Construction site plant – Non-Road Mobile Machinery (NRMM)

- 8.3.21 There are likely to be emissions to air during construction activities arising from on-site construction plant or NRMM. The IAQM guidance [Ref 58] states:
- “Experience of assessing the exhaust emissions from on-site plant (NRMM) and site traffic suggests that they are unlikely to make a significant impact on local air quality, and in the vast majority of cases they will not need to be quantitatively assessed. For site plant and on-site traffic, consideration should be given to the number of plant/vehicles and their operating hours and locations to assess whether a significant effect is likely to occur.”*
- 8.3.22 The screening criterion in the EPUK/IAQM guidance [Ref 57] states that only properties and habitat sites within 250m of roads should be considered in traffic assessments. This has been considered in determining the potential for impacts from NRMM associated with the Proposed Development on sensitive receptors. A qualitative assessment of the potential for impact from NO₂ and PM₁₀ emissions from NRMM on identified receptors has therefore been made and is set out in Section 8.6

Construction traffic assessment

- 8.3.23 The incomplete combustion of fuel in vehicle engines results in the presence of combustion products of CO, PM₁₀, and PM_{2.5} in exhaust

emissions as well as hydrocarbons such as benzene and 1,3-butadiene. Similarly, but to a lesser extent, any sulphur in the fuel can be converted to SO₂ that is then released to atmosphere. In addition, at the high temperatures and pressures found within vehicle engines, some of the nitrogen in the air and the fuel is oxidised to form NO_x, mainly in the form of nitric oxide (NO), which is then converted to NO₂ in the atmosphere. NO₂ is associated with adverse effects on human health. Selective Catalytic Reduction (SCR) to reduce NO_x emissions is employed, although this leads to an additional emission of NH₃ from 'ammonia slip'. Better emission control technology and fuel specifications are expected to reduce emissions per vehicle across the UK vehicle fleet in the long term.

- 8.3.24 Although SO₂, CO, benzene, and 1,3-butadiene are present in motor vehicle exhaust emissions, detailed consideration of the associated impacts on local air quality is not considered relevant in the context of this Proposed Development. This is because the released concentrations of these pollutants are low enough so as to not be likely to give rise to significant effects. In addition, no areas within the administrative boundaries of STBC or RCBC are considered to be at risk of exceeding the relevant objectives for these pollutants, therefore the risks to the attainment of the relevant air quality objectives in the vicinity of the Proposed Development are considered negligible. Emissions of SO₂, CO, benzene, and 1, 3-butadiene from road traffic are therefore not considered further within this assessment.
- 8.3.25 The exhaust emissions from road vehicles that do have the potential to affect the ambient concentrations of pollutants are NO_x, PM₁₀, PM_{2.5} and NH₃. Therefore, the assessment of the significance of road traffic air quality impacts only considers these pollutants.
- 8.3.26 Guidance published by the EPUK/IAQM [Ref 57] sets out criteria to establish the need for an air quality assessment from road traffic. As the Proposed Development is not within or adjacent to an AQMA, the following criteria applies to the assessment:
- A change in Light Duty Vehicle (LDV) flows of more than 500 Annual AADT; or
 - A change in Heavy Duty Vehicles (HDV) flows of more than 100 AADT.
- 8.3.27 LDVs are defined as cars and small vans <3.5t gross vehicle weight, whilst HDVs are defined as goods vehicles and buses >3.5t gross vehicle weight.
- 8.3.28 The roads where the EPUK/IAQM screening criteria [Ref 57] is exceeded is defined as the ARN. The ARN can then be used to identify sensitive human and ecological receptors which are located within 200m of the ARN.

- 8.3.29 Based on the AADT associated with the construction phase of the Proposed Development (detailed in **Appendix 8A: Construction Air Quality Assessment (ES Volume III, Application Document Ref. 6.3)**) detailed air quality modelling is required.
- 8.3.30 The modelling assessment has used the latest version of dispersion modelling software 'ADMS-Roads' (v5.1.0.2) [Ref 63]. ADMS-Roads is a modern dispersion model that has an extensive published track record of use in the UK for the assessment of local air quality impacts, including model validation and verification studies.
- 8.3.31 The details of the assessment of traffic are presented in **Chapter 18: Traffic and Transportation (ES Volume I, Application Document Ref. 6.1)**. The traffic data used in this assessment includes the following scenarios:
- 2024 Baseline scenario;
 - 2030 Do Minimum (DM) scenario which is the future construction year traffic flows without the construction of the Proposed Development; and
 - 2030 Do Something (DS) scenario, which is the same as the DM scenario but includes the construction traffic generated by the construction of the Proposed Development.
- 8.3.32 The future decommissioning baseline scenario is not included, as it is considered that the effects would be comparable to, or lower than, construction impacts, particularly given the expected improvements in vehicle fleet emissions over that time.
- 8.3.33 Data in the form of traffic flows, composition (percentage HDV), and speed is used in modelling of emissions from road traffic during the construction phase.
- 8.3.34 Consideration has also been given within the assessment to the potential cumulative traffic emissions from the construction of the Proposed Development as well as the contribution from traffic associated with other committed schemes in the area. This is discussed further in **Chapter 18: Traffic and Transportation (ES Volume I, Application Document Ref. 6.1)**.
- 8.3.35 The construction traffic data and modelled network are detailed **Appendix 8A: Construction Air Quality Assessment (ES Volume III, Application Document Ref. 6.3)**.
- Construction shipping emissions
- 8.3.36 As defined in **Chapter 20: Marine Navigation (ES Volume I, Application Document Ref. 6.1)** and **Appendix 20A: Navigation Risk Assessment**

(NRA) (**ES Volume III, Application Document Ref. 6.3**), the construction of the Proposed Development covers two main phases of marine operations:

- Phase 1: Construction of the quay (and demolition of existing infrastructure) and dredging of the berth pocket and access channel; and
- Phase 2: Marine operations during the construction of the Proposed Development (import of construction materials and modules).

8.3.37 The LAQM TG(22) [Ref 56] guidance highlights that large ships generally burn high sulphur content oils in their main engines (bunker oils). For large ports, these may give rise to elevated short-term SO₂ concentrations, which might lead to exceedances of the 15-minute or 1-hour mean objectives. NO_x and PM emissions may also lead to elevated concentrations at sensitive receptors around ports.

8.3.38 TG(22) [Ref 56] provides guidance on assessing shipping emissions, stating that an assessment may be required where the following occurs:

- More than 5,000 large ship movements per year, with relevant exposure within 250m of the berth and main areas of manoeuvring; or
- More than 15,000 large ship movements per year, with relevant exposure within 1km of these areas.

8.3.39 Large ships are defined as cross-channel ferries, roll on-roll off ships, bulk cargo, container ships, cruise liners, etc – one ship generating two movements (arrival and departure) [Ref 56].

8.3.40 Should one of the above criteria be met, the relevant authority is required to identify where there is a risk of short-term objectives for NO₂, PM₁₀ and SO₂ being impacts, and a monitoring survey (6-month period minimum) should be carried out at relevant receptor locations. This can also be supported by dispersion modelling of shipping emission, although, TG(22) recognises that modelling of shipping emissions are likely to be subjected to high uncertainties due to the assumptions that are required as part of the assessment and lack of publicly available data [Ref 56].

8.3.41 For both Phase 1 and Phase 2, the overall shipping movements were below 5,000 movements, with 1,993 movements occurring in Phase 1 and 2,000 movements occurring in Phase 2. No sensitive human receptors were identified within 250m or 1km of the study area either. On this basis, it was determined that an assessment of shipping emissions on sensitive human receptors can be screened out from requiring assessment.

- 8.3.42 In their consultation response, Natural England advises a precautionary approach to be taken on shipping emissions in relation to sensitive ecological receptors. They state that consideration should be given to whether large ships will emit constantly whilst docked, the type of fuels will be used and what impact it would have on the total amount of emissions.
- 8.3.43 In response to the precautionary approach advised by Natural England and due to the fact that there are sensitive ecological receptors within 1km of the shipping route, an assessment of construction phase shipping emissions has been undertaken to determine potential impacts on the sensitive ecological receptors.
- 8.3.44 For the determination of the potential impacts from construction shipping emissions, both Phase 1 and Phase 2 have been assessed separately. It is assumed that these phases occur independently, with Phase 1 happening first followed by Phase 2. It is assumed that Phase 1 represents the worst-case construction scenario as it involves the most transits and hours with ships idling at berth. However, the ships involved in the two phases are very different, with Phase 1 mainly relying on smaller service vessels and Phase 2 utilising larger vessels such as an MC-Class vessel and a 10,000 Deadweight Tonnage (DWT) Coaster.
- 8.3.45 To understand the potential impacts of shipping on nearby sensitive receptors an assessment was undertaken on the shipping emissions both when the vessels are idling at berth as well as when they are transiting through the River Tees.
- 8.3.46 The modelling assessment has used the latest version of dispersion modelling software 'ADMS-Roads' (v5.1.0.2) [Ref 63].
- 8.3.47 In addition to the information contained within **Chapter 20: Marine Navigation (ES Volume I, Application Document Ref. 6.1)** and **Appendix 20A: NRA (ES Volume III, Application Document Ref. 6.3)**, the fourth IMO GHG study has been used as key source of information for the construction shipping assessment [Ref 27].
- 8.3.48 Full details on the methodology for the construction shipping assessment are detailed in **Appendix 8A: Construction Air Quality Assessment (ES Volume III, Application Document Ref. 6.3)**.

Operational

Operational traffic assessment

- 8.3.49 The methodology for the operational traffic assessment is the same as that defined above for construction traffic, with the exception of the assessment scenarios. The assessment scenarios for the operational traffic assessment are as follows:

- 2024 Baseline scenario;
 - 2031 DM scenario which is the future operational year traffic flows without the Proposed Development; and
 - 2031 DS scenario, which is the same as the DM scenario but includes the traffic generated by the operation of the Proposed Development.
- 8.3.50 The operational traffic data and modelled network are detailed in **Appendix 8B: Operational Air Quality Assessment (ES Volume III, Application Document Ref. 6.3)**.
- Operational shipping emissions*
- 8.3.51 As defined in **Appendix 20A: NRA (ES Volume III, Application Document Ref. 6.3)**, operational shipping movements constitute Phase 3 of the marine operations, which covers the import of biomass and wood feedstock via the quay. As such, only this phase has been included in the operational shipping assessment.
- 8.3.52 It is intended that SAF will be exported from the Proposed Development via pipelines to third party marine export facilities. As such, it is not considered necessary to assess the air quality impacts arising from the marine export of SAF and naphtha during the operational Phase of the Proposed Development.
- 8.3.53 In total, during the operational phase, there will be 93 large ship movements annually for the import of biomass and wood feedstock and therefore it is considered that this represents a small number of vessels movements when compared to the TG(22) guidance thresholds [Ref 56]. However, in line with the precautionary approach advised by Natural England, the impacts of these shipping movements have been assessed.
- 8.3.54 The methodology for the operational shipping assessment is the same as that defined above for construction shipping assessment, with the exceptions of the type vessels being assessed. Any key differences between the construction and operational shipping assessments are outlined in the sections below.
- 8.3.55 To understand the potential impacts of shipping on nearby sensitive receptors an assessment was undertaken on the shipping emissions both when the vessels are idling at berth as well as when they are transiting through the River Tees.
- 8.3.56 The modelling assessment has used the latest version of dispersion modelling software 'ADMS-Roads' (v5.1.0.2) [Ref 63].
- 8.3.57 In addition to the information contained within **Chapter 20: Marine Navigation (ES Volume I, Application Document Ref. 6.1)** and **Appendix**

20A: NRA (ES Volume III, Application Document Ref. 6.3), the fourth IMO GHG study has been used as key source of information for the construction shipping assessment [Ref 27].

- 8.3.58 Full details on the methodology for the operational shipping assessment are detailed in **Appendix 8B: Operational Air Quality Assessment (ES Volume III, Application Document Ref. 6.3)**.

Operational plant assessment

- 8.3.59 Emissions from the operational Proposed Development have been assessed using the EA's Risk Assessment methodology [Ref 15] in order to identify where proposed emissions can be screened out as being unlikely to cause significant effects.
- 8.3.60 Detailed dispersion modelling using the atmospheric dispersion model ADMS (currently ADMS version 6.0.2) [Ref 63] has been used to calculate the concentrations of pollutants at identified receptors. These concentrations have been compared with the defined AQAL for each pollutant species, as summarised in Table 8.1 to Table 8.3.
- 8.3.61 Dispersion modelling calculates the predicted concentrations arising from the emissions to atmosphere, based on Gaussian approximation techniques. The model employed has been developed for UK regulatory use. **Appendix 8B: Operational Air Quality Assessment (ES Volume III, Application Document Ref. 6.3)** details the model inputs for the assessment.
- 8.3.62 The first operational year of the Proposed Development is assumed to be in 2031 for the purpose of this assessment, which is the earliest date that the Proposed Development could realistically start to operate after commissioning.
- 8.3.63 The assessment of worst-case long-term (annual mean) and short-term (daily and hourly mean) emissions resulting from the operation of the Proposed Development has been undertaken by comparing the maximum Process Contributions ('PC') that occurs at any identified human health receptor, (in order to ensure a worst-case assessment in terms of human health impacts) with the annual mean and hourly mean AQAL, taking into consideration the baseline air quality, in accordance with EA's Risk Assessment methodology [Ref 15]. For annual average impacts and short-term impacts, it has been assumed that all plant is operating concurrently for the whole year, in order to ensure that the worst-case meteorological conditions are taken into account.
- 8.3.64 An assessment of nutrient nitrogen enrichment has been undertaken by applying published deposition velocities to the predicted annual average

NO₂ and NH₃ concentrations at the identified ecological sites, determined through dispersion modelling, to calculate nitrogen deposition rates (expressed as kilograms of nitrogen per hectare per year, KgN/ha/yr). These deposition rates have then been compared to the Critical Loads for nitrogen published by APIS [Ref 14], taking into consideration the baseline air quality.

- 8.3.65 Potential increases in acidity on designated ecological receptors from depositional contributions of NO₂, NH₃, SO₂, HCl and HF have also been considered.
- 8.3.66 Acid deposition is derived from nitrogen deposition modelling values for NO₂ and NH₃ using standard conversion factors and expressed as kilograms of nitrogen equivalent per hectare per year (KgNeq/ha/yr). Whilst acid deposition from SO₂ is determined using the relevant standard conversion factors and expressed as kilograms of sulphur equivalent per hectare per year (KgSeq/ha/yr). Emission of HCl and HF from the Proposed Development will also be considered in the assessment of acid deposition and expressed as kilo equivalents per hectare per year (Keq/ha/yr).
- 8.3.67 The PC acid deposition rates and baseline deposition rates have been used within the APIS Critical Load Function Tool [Ref 14] to determine whether the contribution will result in exceedance of the defined acidity Critical Loads for the most sensitive feature.
- 8.3.68 In line with the EA's Risk Assessment methodology [Ref 15], substance deposition to ground (mg/m²/day) has been considered to determine the potential impact when absorbed by soil and leaves ('deposition') for the following substances:
- As;
 - Cd;
 - Cr;
 - Cu
 - Pb;
 - Hg; and
 - Ni.

Evaluation of significance

Construction and operational traffic

- 8.3.69 The 2017 EPUK/IAQM guidance note 'Land-Use Planning & Development Control' provides an approach to determining the air quality impacts

resulting from a proposed development, referred to as impact descriptors, and the overall significance of local air quality effects arising from a proposed development [Ref 57].

- 8.3.70 Firstly, impact descriptors are determined based on the magnitude of incremental change as a proportion of the relevant assessment level, in this instance the annual mean NO₂, PM₁₀, and PM_{2.5} objectives. The change is then examined in relation to the predicted total pollutant concentrations in the assessment year and its relationship with the annual mean NO₂, PM₁₀, and PM_{2.5} objectives.
- 8.3.71 If the impact descriptor is negligible or slight, this is considered to not have a significant effect. The overall significance is determined by professional judgement.
- 8.3.72 The assessment framework for determining impact descriptors at each of the assessed receptors is shown in Table 8.10.

Table 8.10 Impact descriptors

Annual average concentrations at receptor in the assessment years	% Change in concentrations relative to annual mean NO ₂ and PM ₁₀ objectives			
	1	2 - 5	6 - 10	>10
75% or less of objective	Negligible	Negligible	Slight	Moderate
76 – 94% of objective	Negligible	Slight	Moderate	Substantial
95 – 102% of objective	Slight	Moderate	Moderate	Substantial
103 – 109% of objective	Moderate	Moderate	Substantial	Substantial
110% or more of objective	Moderate	Substantial	Substantial	Substantial
Note: Changes in pollutant concentrations of less than 1% i.e. <0.5% would be described as negligible				

- 8.3.73 The guidance also provides advice for determining the magnitude of change for hourly mean NO₂ concentrations, which is shown in Table 8.11. The impact descriptor is determined by considering the process contribution only. However, in assessing the significance, consideration is also given to total pollutant concentrations, including background concentrations, and comparison of these with the hourly mean NO₂ objective.

Table 8.11 Magnitude of change for hourly mean NO₂ concentrations

Changes in hourly mean concentrations at receptor in the assessment year	Magnitude of change	Impact descriptors
<10% of hourly mean NO ₂ threshold	Imperceptible	Negligible
10 – 20% of hourly mean NO ₂ threshold	Small	Slight
20 – 50% of hourly mean NO ₂ threshold	Medium	Moderate
>50% of hourly mean NO ₂ threshold	Large	Substantial

8.3.74 The impact descriptors at each of the assessed receptors can then be used as a starting point to make a judgement on the overall significance of effect of a Proposed Development, however other influences would also need to be taken into account, such as:

- The existing and future air quality in the absence of the development;
- The extent of current and future population exposure to the impacts; and,
- The influence and validity of any assumptions adopted when undertaking the prediction of impacts.

8.3.75 Professional judgement should be used to determine the overall significance of effects of the Proposed Development, however in circumstances where the Proposed Development can be judged in isolation, it is likely that a 'moderate' or 'substantial' impact will give rise to a significant effect and a 'negligible' or 'slight' impact will not result in a significant effect.

Operational plant emissions

8.3.76 The 2017 EPUK/IAQM guidance note 'Land-Use Planning & Development Control' provides an approach to determining the air quality impacts resulting from a Proposed Development and the overall significance of local air quality effects arising from a Proposed Development [Ref 57].

8.3.77 Firstly, impact descriptors are determined based on the magnitude of incremental change as a proportion of the relevant assessment level, in this instance for operational plant emissions, the annual mean AQALs for NO₂, PM₁₀, PM_{2.5}, NO_x, HF and VOCs alongside various metals (As, Sb, Cd, Cr(VI), Co, Pb, Mn, Ni, Ti). The change is then examined in relation to the predicted total pollutant concentrations in the assessment year and its relationship with the relevant objectives.

- 8.3.78 If the impact descriptor is negligible or slight, this it is considered to not have a significant effect. The overall significance is determined by professional judgement.
- 8.3.79 The assessment framework for determining impact descriptors at each of the assessed receptors for the operational plant assessment is the same as the construction and operational traffic assessment described above and is shown in Table 8.10. The guidance also provides advice for determining the magnitude of change for short term concentrations, which is shown in Table 8.11. Relevant short term pollutants assessed at sensitive human receptors include hourly NO₂, daily PM₁₀, hourly CO and 8 hour running mean CO, 15-minute mean, hourly mean and daily mean SO₂. Additionally, hourly mean HCl alongside hourly and monthly mean HF concentrations have been assessed. This is alongside various metals (Hg (daily and hourly), Cd (daily), Sb (hourly), Cu (daily), Cr(III) daily, Mn (hourly), Ni (hourly), V (daily), Co (hourly) and Tl (hourly)).
- 8.3.80 For sensitive ecological receptors, annual and daily NO_x, annual SO₂, annual NH₃ and daily/weekly mean HF concentrations have been assessed alongside nutrient nitrogen and acid deposition.
- 8.3.81 Specific significance criteria relating to impacts on sensitive designated ecological receptors are set out within the EA Risk Assessment guidance [Ref 15]. The impact of stack emissions can be regarded as insignificant at sites with statutory designations if:
- the long-term PC is less than 1% of the critical level, or if greater than 1% then the PEC is less than 70% of the critical level; and
 - the short-term PC is less than 10% of the critical level
- 8.3.82 The impact of stack emissions can be regarded as insignificant at sites of local importance if:
- the long-term PC is less than 100% of the critical level; and
 - the short-term PC is less than 100% of the critical level.
- 8.3.83 Professional judgement should be used to determine the overall significance of effects of the Proposed Development, however in circumstances where the Proposed Development can be judged in isolation, it is likely that a 'moderate' or 'substantial' impact will give rise to a significant effect and a 'negligible' or 'slight' impact will not result in a significant effect.

Construction and operational shipping

- 8.3.84 Both the construction and operational shipping assessments have made use of the 2017 EPUK/IAQM significance guidance described above [Ref 57], as well as the EA Risk Assessment guidance [Ref 15] to determine if impacts can be regarded as insignificant at sites with statutory designations.

Evaluation of significance – Proposed Development as a whole

- 8.3.85 Following the assessment of each individual air quality effect (dust, road traffic, shipping and operational plant), the significance of all of the reported effects is then considered for the Proposed Development in overall terms, recognising that construction effects have the potential to occur in the same time period, but that operational effects would occur at a later date.
- 8.3.86 The potential for the Proposed Development to contribute to, or interfere with, the successful implementation of policies and strategies for the management of local air quality are considered if relevant, but the principal focus is any change to the likelihood of future achievement of the NAQS, (which also relate to compliance with local authority goals for LAQM and objectives set for the protection of human health).
- 8.3.87 In terms of the significance of the effects (consequences) if there are any adverse impacts, an effect is reported as being either 'not significant' or as being 'significant' for human receptors, whilst for ecological receptors the terms 'insignificant' and 'significant' are used to align with the EA Risk Assessment guidance [Ref 15].
- 8.3.88 If the overall effect of the development on local air quality or on amenity is found to be 'moderate' or 'major' this is deemed to be 'significant' for Environmental Impact Assessment (EIA) purposes. Effects found to be 'minor' or 'negligible' are considered to be 'not significant'.

Sources of information and data

- 8.3.89 Construction dust data has been based on a worst-case assumption as detailed information on the earthworks, demolition, construction and trackout is not currently available. As a result, it has been assumed that the dust emission magnitude for each of these stages is 'high' in line with the IAQM Construction Dust Guidance [Ref 58]. This was selected to ensure that any mitigation measures recommended will be sufficient regardless of the actual amount of construction dust emitted during the construction phase. However, it is likely that the potential construction dust emissions from the Proposed Development during the construction phase will be lower than what has been assessed.

- 8.3.90 Construction traffic data used in this assessment is based on the information provided in **Chapter 18: Traffic and Movement (ES Volume I, Application Document Ref. 6.1)**.
- 8.3.91 Information for the construction and operational shipping assessment is based on information contained with **Chapter 20: Marine Navigation (ES Volume I, Application Document Ref. 6.1)**, **Appendix 20A: NRA (ES Volume III, Application Document Ref. 6.3)**. The fourth IMO GHG study [Ref 27] has also be used extensively to inform the assessment.
- 8.3.92 The dispersion modelling of operational point source emissions has been based on design data from the project engineers for the various sources of emissions to air. Emission concentrations have been based on the BAT-AELs for the relevant processes being carried out, or where lower emission concentrations are required to ensure impacts are acceptable, these have been modelled. Due to the early stage of plant design, conservative assumptions on emission parameters and concentration have been taken, and therefore it is anticipated that actual impacts from the operation of the Proposed Development be lower than those presented in the assessment.
- 8.3.93 The modelling takes into consideration the sensitivity of predicted results to model input variables, and to ultimately identify the realistic worst-case results for inclusion in the assessment. These variables include:
- meteorological data, for which five years' data (2020 - 2024) from Teesside Airport have been used, the use of which is discussed in **Appendix 8B: Air Quality - Operational Assessment (ES Volume III, Application Document Ref. 6.3)**; and
 - inclusion of buildings, structures and local topography that could affect dispersion from the source into the modelling scenarios.

[Use of the Rochdale Envelope](#)

- 8.3.94 The Rochdale Envelope approach has been adopted to present a worst-case assessment of potential environmental effects of the different parameters of the Proposed Development that cannot yet be fixed. The parameters included within the Rochdale Envelope are described in **Chapter 4: Proposed Development (ES Volume I, Application Document Ref. 6.1)**.
- 8.3.95 The construction assessment has been based on the conservative assumption of the peak construction year of 2030, in line with **Chapter 18: Traffic and Movement (ES Volume I, Application Document Ref. 6.1)**.
- 8.3.96 Subject to the necessary consents being granted and an investment decision being made, construction of the Proposed Development could potentially start in 2028 at the earliest. It is envisaged that the Proposed

Development will have a design life of 25 years as a minimum but it is expected to have an operational life that is longer than that, subject to the commercial position at that time. At this stage, it is therefore expected that the Proposed Development will have some residual life remaining after 25 years of operation, and an investment decision would be made at that time based on an assessment of the technical feasibility and the market conditions prevailing at that time.

- 8.3.97 For the purposes of assessing the worst-case scenario for the operational air quality assessment, full load operation has been assessed for all plant. It is anticipated that the Proposed Development will be operational for 24 hours a day continuously, hence for 8,760 hours per year.
- 8.3.98 Additionally, the short-term impacts need to be assessed continuously to ensure that the meteorological data that leads to the worst-case impacts have been considered in the assessment. Furthermore, assessing continuous operation ensures that there would be no restriction on running hours implemented through the Environmental Permit.
- 8.3.99 The building dimensions included within the assessment are the maximum dimensions under consideration. It is envisaged that should the actual buildings be smaller in size, specifically in height, than those used in the assessment, then this would have the potential to reduce the plume downwash effects associated with buildings in close proximity to the stacks, therefore improving emission dispersion. This would lead to a reduction in the level of impact predicted in the assessment, or enable the proposed stack heights to be reduced to result in a similar magnitude of impact presented in this assessment.
- 8.3.100 Locations of the stacks and buildings as modelled in this assessment are provided in **Figure 8.9 (ES Volume II, Application Document Ref. 6.2)**.

[Assessment assumptions and limitations](#)

- 8.3.101 The data presented in this ES is based on the current understanding of the emissions performance of the Proposed Development. The assessed parameters and methodology used in the assessment of air quality impacts is detailed within this chapter and the supporting appendices (**Appendix: 8A: Construction Air Quality Assessment and Appendix 8B: Operational Air Quality Assessment (ES Volume III, Application Document Ref. 6.3)**).
- 8.3.102 For the construction dust assessment, exact quantities and details related to the earthworks, demolition, construction and trackout are unknown. As such, a large dust emission magnitude was assumed for these aspects to provide a more conservative assessment.

- 8.3.103 Until detailed design on the Proposed Development has been completed and plant equipment and abatement technologies selected, there will be some degree of uncertainty in the operational emissions used in the assessment. Therefore, in order to minimise the likelihood of under-estimating the predicted impacts for the operational emissions, a number of conservative assumptions have been made in the assessment, as detailed in the **Appendix 8B: Operational Air Quality Assessment (ES Volume III, Application Document Ref. 6.3)**.
- 8.3.104 There is also uncertainty associated with any modelling assessment, due to the inherent uncertainty of the dispersion modelling process itself. Despite this, the use of dispersion modelling is a widely applied and accepted approach for the prediction of impacts from industrial and transport sources. inherent areas of uncertainty when it comes to air quality dispersion modelling, include:
- simplification in model algorithms and empirical relationships that are used to stimulate complex physical and chemical processes in the atmosphere;
 - spatial variability of model background concentrations;
 - spatial variability of meteorological data;
 - effects of terrain; and,
 - emissions concentrations due to varied raw material inputs.
- 8.3.105 The methodology used within this assessment is designed to provide an assessment of possible impact as far as practicable based on the data available. Where possible the assessment has aimed to reduce uncertainty by reviewing risks and providing additional commentary based on professional judgement regarding the results. It is recognised that the data limitations lead to areas of uncertainty which will need to be addressed once the detailed design is available. This would involve an updated modelling assessment to ensure that the impacts are no worse than those described in this Chapter, which it is anticipated will be required as a pre-operational condition for the Environmental Permit.
- 8.3.106 The construction traffic data is highly conservative and is based on the worst case peak of the four year construction period, although the average construction traffic is likely to be much less.
- 8.3.107 As outlined in TG(22) [Ref 56], modelling of shipping emissions is subject to high uncertainties and a number of assumptions have had to be made as part of the assessment. These assumptions have been made using data from sources such as the **Appendix 20A: NRA (ES Volume III,**

Application Document Ref. 6.3) and the fourth IMO GHG study [Ref 27].

These assumptions include:

- the dimensions and location of the berthing pocket are defined in **Appendix 20A: NRA (ES Volume III, Application Document Ref. 6.3)** and have been used to inform the assessment. For the assessment of shipping emissions whilst at berth, it has been assumed that the area (m²) for the assessment is the equivalent to the dimensions of the largest vessel, with the berthing pocket being located just-off shore from the Proposed Development. Where it is assumed that the vessels would be idling whilst being loaded or unloaded.
- the origin of the shipping vessels used in the three marine phases is not currently known. Therefore, an assumption has been made that all vessels will travel from outside of the Tees and Hartlepool port area. A route has been plotted through the centre of the channel using existing shipping data;
- the speed of the vessels navigating the River Tees has been assumed to be 8 knots, which is defined as the speed limit for vessels passing the North Tees “A” Jetty [Ref 25]. A reduced speed of 6 knots has been used for the lower portion of the route to account for vessels slowing as they come into berth;
- it is assumed that for the construction phase, the period of activity will be 24-hours a day throughout both of the marine construction phases;
- for Marine Phase 2, it has been assumed that all 200 movements for the construction of the landside facilities will be undertaken by the MC-Class vessel (this excludes the import of bulk aggregate). In addition, it is assumed that there will be four tugs associated with every movement of the MC-Class vessel;
- to determine the emissions from each vessel, the fourth IMO GHG study [Ref 27] has been used. These details engine load for various common vessel types. However, it does not capture every possible vessel type. Where this occurs, an assumption has been made to classify various service vessels as the ‘service – other’ vessel type. For the MC-Class and backhoe dredger, these are specialised vessels and do not fit into one of the pre-defined categories. Therefore, examples have been sought to allow for an assessment of emissions based on main engine and auxiliary engine load;
- the flat deck barges included in **Appendix 20A: NRA (ES Volume III, Application Document Ref. 6.3)** have been excluded from the assessment as they are assumed to have no engine and will instead be

manoeuvred using a tug. Equally, the general workboat / dive support / crew transfer boats have been excluded from the assessment as they would not be idling at berth and they are only transiting short distances within the existing port area;

- based on the fourth IMO GHG study [Ref 27], it has been assumed that PM_{2.5} emissions account for 92% of the total PM emissions;
- the release height of each vessel at berth and manoeuvring has been based on the estimated heights taken from Southampton Clean Air Zone - Air Quality Modelling Methodology report [Ref 26].
- for the assessment of emissions at berth, it has been assumed that all vessels will turn off their main engines and will only run on auxiliary engines and use boiler power (where one is installed);
- for the assessment of vessels manoeuvring, the power output (kW) is based on the load at sea as defined in the fourth IMO GHG study [Ref 27];
- the emission factors used in the assessment assume a worst-case scenario, with the use of heavy fuel oil with 2.6% sulphur content, [Ref] and slow-speed Tier II engines; and
- sources were modelled with a velocity of 15m/s and at ambient temperature (as determined by the meteorological data used).

8.3.108 The biomass and waste wood CHP plant will combust either sustainably-sourced biomass, waste wood or a combination of the two. Therefore, the BAT-AELs used in the assessment have been based around this assumption and the approach taken has been to model the emissions at the most stringent BAT-AEL applicable for both biomass or waste wood, as agreed with the EA during pre-application discussion on the Environmental Permit. This assumes that any mix between 100% biomass and 100% waste wood should be acceptable based on the outcomes of the worst case assumptions of either 100% biomass or 100% waste wood.

8.3.109 The final height of stacks for the operational Proposed Development will be determined as part of the detailed design stage, however, they will not exceed the parameters set out in Schedule 2 of the **draft Development Consent Order (Application Document Ref. 3.1)**. However, various stack heights were modelled and assessed to identify the configuration that would result in acceptable impacts at both human health and ecological receptors, taking into account the current design detail and building heights used in the dispersion modelling assessment.

8.3.110 Exact stack diameters are also still to be determined and for this assessment have been determined based on the volumetric flow rate (m^3/s) and a desired efflux velocity of up to approximately 30m/s for the modelled emission points.

8.3.111 Exact building dimensions and locations have yet to be confirmed for the Proposed Development, as such, the maximum building heights have been used to represent the approximate building locations in the each of the different process areas.

8.4 Baseline conditions

Existing baseline – sensitive receptors

Construction phase

8.4.1 Based on IAQM guidance [Ref 58], during the construction phase, receptors potentially affected by dust soiling and short-term concentrations of PM_{10} generated during construction activities are limited to:

- a ‘human receptor’ within 250m of the Proposed Development and/or 50m of the route(s) used by construction vehicles on the public highway, up to 250m from the site entrance(s); and
- an ‘ecological receptor’ within 50m of the Proposed Development and/or 50m of the route(s) used by construction vehicles on the public highway, up to 250m from the site entrance(s).

8.4.2 As described in **Chapter 5: Construction Programme and Management (ES Volume I, Application Document Ref. 6.1)**, construction traffic in North Tees would access the Proposed Development via Seal Sands Road, which connects to the trunk road network via the A1185 and the A689/A19. There will also be access from Huntsman Drive via the linkline pipeline corridor (**Figure 5.1, ES Volume II, Application Document Ref. 6.2**).

8.4.3 **Chapter 5: Construction Programme and Management (ES Volume I, Application Document Ref. 6.1)** also states that for construction traffic access to the pipeline connections in the South Tees portion of the Proposed Development, access would either be from Wilton International North Gate off the A1085 Steel House Gate Roundabout and then via the internal Sembcorp Road network to the Dabholm Gut, or alternatively, via the A1053, Tees Dock Road. An assessment of construction traffic accessing the South Tees portion of the Proposed Development has not been considered, due to the relatively low predicted vehicle movements which are likely to be below the EPUK/IAQM screening criteria [Ref 57].

- 8.4.4 Receptors potentially affected by the exhaust emissions associated with construction phase vehicle movements are those located within 200m of the ARN used by construction traffic to access the Proposed Development.
- 8.4.5 Identified receptors for construction activities are detailed in Table 8.12, with the key population areas with regard to construction dust shown in **Figure 8.2 (ES Volume II, Application Document Ref. 6.2)** and construction traffic receptors shown in **Figure 8.3 and Figure 8.4 (ES Volume II, Application Document Ref. 6.2)**.

Table 8.12 Identified receptors with potential for air quality impacts from construction of the Proposed Development

ID	Receptor name	Designation	X	Y	Shortest distance to source (m)
Construction traffic assessment – Human receptors					
CT001	Cowpen Lane Farm	Residential	448225	524996	151
CT002	Cowpen Bewley	Residential	448062	525341	83
CT003	Rowlands Grove	Residential	447154	525670	46
CT004	Wansford Close	Residential	447004	525864	16
CT005	Bewholme Close	Residential	446264	526075	22
CT006	Dryden Close	Residential	446096	526021	28
CT007	Tennyson Road	Residential	445773	525903	34
CT008	Wolviston Back Lane	Residential	447237	525539	107
CT009	Elvington Close	Residential	446657	526082	54
CT010	Saltview Terrace	Residential	450050	521621	23
CT011	Port Clarence Road	Residential	449565	521885	16
CT012	High Clarence Primary School	School	449470	521964	9
CT013	Meadowdale Close	Residential	449168	522213	16
CT014	Haverton Hill Hotel	Residential	448698	522596	3
CT015	Kingsway Medical Centre	Medical Centre	449696	521823	30
CT016	Haydon Green	Residential	445649	525748	43
CT017	Sunderland Road	Residential	445365	525930	41
CT018	Coal Lane	Residential	445002	525944	57
CT019	Kids 1st - Wynyard	Nursery	444263	526291	53
CT020	Eden Way	Residential	444183	524836	57
CT021	Cranstock Close	Residential	444091	524264	72
CT022	Rook Lane	Residential	444719.7103	522986	112
Construction traffic assessment – Ecological receptors					
CE001	Teesmouth and Cleveland Coast	SPA, Ramsar and SSSI	450600	523713	13
CE002			450688	523724	5
CE003			450860	522636	25
CE004			450186	521692	12
CE005			448982	522611	36
CE007			448986	524676	41
CE008			450639	523536	23
CE009	Cowpen Bewley Woodland Park	LNR	447971	525275	17

ID	Receptor name	Designation	X	Y	Shortest distance to source (m)
CE011	Billingham Beck Valley	LWS	444777	523134	22
CE013	A19 Gorse Field	LWS	444176	523790	22
CE014	Portrack Meadows	LWS	447376	519758	30
Construction shipping assessment – Ecological receptors					
SE001	Teesmouth and Cleveland Coast & Saltholme LWS	Ramsar, SPA, SSSI, NNR, LWS	454272	526950	Quay: 3.1km Shipping Route: 341m
SE002	Teesmouth and Cleveland Coast	Ramsar, SPA, SSSI	455556	527008	Quay: 3.5km Shipping Route: 825m
SE003	Teesmouth and Cleveland Coast	Ramsar, SPA, SSSI, NNR	453959	526193	Quay: 2.3km Shipping Route: 502m
SE004	Teesmouth and Cleveland Coast & Seaton Dunes and Common	Ramsar, SPA, SSSI, NNR	454278	528315	Quay: 4.5km Shipping Route: 767m
SE005	Teesmouth and Cleveland Coast	Ramsar, SPA, SSSI	455624	527450	Quay: 4.5km Shipping Route: 695m
SE006	Teesmouth and Cleveland Coast	Ramsar, SPA, SSSI	453586	525412	Quay: 1.6km Shipping Route: 1.0km
SE007	Teesmouth and Cleveland Coast	Ramsar, SPA, SSSI	454702	526166	Quay: 2.4km Shipping Route: 230m
Note: After consultation with the Applicant's ecologist, it was determined that ecological receptors CE006, CE010 and CE012 could be removed from the assessment. CE006 and CE010 were points for Teesmouth and Cleveland Coast designation. But the location of these points only referred to the water and could therefore be removed as critical loads are not applicable to water. CE012 was for the Stockton LWS Gravel Hole Quarry, this site is a former disused quarry, and it was determined that the Critical Levels and Critical Loads would not apply to this site.					

Operational phase

Operational traffic and shipping

- 8.4.6 For the operational traffic assessment, receptors have been selected in accordance with the methodology described above for the construction traffic assessment.
- 8.4.7 The operational traffic ARN, is smaller than the construction traffic ARN. However, it incorporates a number of the same roads, notably the A1185 to

the Wolviston Interchange with the A19. As a result, the operational traffic assessment contains a sub-set of the construction traffic receptors outlined above in Table 8.12. The relevant sensitive receptors for the operational traffic and shipping assessment are outlined below in Table 8.13 and are shown in shown in **Figure 8.9 to Figure 8.10 (ES Volume II, Application Document Ref. 6.2).**

Table 8.13 Identified receptors with potential for air quality impacts from operational traffic and shipping of the Proposed Development

ID	Receptor name	Designation	X	Y	Shortest distance to Source (m)
Operational traffic assessment – Human receptors					
CT001	Cowpen Lane Farm	Residential	448225	524996	151
CT002	Cowpen Bewley	Residential	448062	525341	83
CT003	Rowlands Grove	Residential	447154	525670	46
CT004	Wansford Close	Residential	447004	525864	16
CT005	Bewholme Close	Residential	446264	526075	22
CT006	Dryden Close	Residential	446096	526021	28
CT007	Tennyson Road	Residential	445773	525903	34
CT008	Wolviston Back Lane	Residential	447237	525539	107
CT009	Elvington Close	Residential	446657	526082	54
CT010	Saltview Terrace	Residential	450050	521621	23
CT016	Haydon Green	Residential	445649	525748	43
CT017	Sunderland Road	Residential	445365	525930	41
CT018	Coal Lane	Residential	445002	525944	56
Operational traffic assessment – Ecological receptors					
CE001	Teesmouth and Cleveland Coast	SPA, Ramsar and SSSI	450600	523713	13
CE002			450688	523724	5
CE003			450860	522636	25
CE007			448986	524676	41
CE008			450639	523536	23
Operational shipping assessment – Ecological receptors					
SE001	Teesmouth and Cleveland Coast & Saltholme LWS	SPA, Ramsar, SSSI, NNR, LWS	454272	526950	Quay: 3.1km Shipping Route: 341m
SE002	Teesmouth and Cleveland Coast	SPA, Ramsar and SSSI	455556	527008	Quay: 3.5km Shipping Route: 825m
SE003	Teesmouth and Cleveland Coast	SPA, Ramsar and SSSI, NNR	453959	526193	Quay: 2.3km Shipping Route: 502m
SE004	Teesmouth and Cleveland Coast & Seaton Dunes and Common	SPA, Ramsar and SSSI, NNR	454278	528315	Quay: 4.5km Shipping Route: 767m

ID	Receptor name	Designation	X	Y	Shortest distance to Source (m)
SE005	Teesmouth and Cleveland Coast	SPA, Ramsar and SSSI	455624	527450	Quay: 4.5km Shipping Route: 695m
SE006	Teesmouth and Cleveland Coast	SPA, Ramsar and SSSI	453586	525412	Quay: 1.6km Shipping Route: 1.0km
SE007	Teesmouth and Cleveland Coast	SPA, Ramsar and SSSI	454702	526166	Quay: 2.4km Shipping Route: 230m

Operational plant

- 8.4.8 Receptors potentially affected by operational plant emissions from the Proposed Development including local residential and amenity receptors have been identified through site knowledge, desk study of local mapping and consultation.
- 8.4.9 Through the dispersion modelling, isopleth figures of pollutant concentration dispersion have been examined, to identify the receptors that will receive the highest point source contributions so that the assessment of impact can be made at these receptors. Those receptors considered to be representative of impacts in the vicinity of the Proposed Development have been modelled as discrete receptors.
- 8.4.10 Ecological receptors potentially affected by operational emissions have been identified through a desk study which included a review of Defra's Magic mapping [Ref 66], communication with the Applicant's ecologists and consultation (see **Chapter 10: Terrestrial Ecology (ES Volume I, Application Document Ref. 6.1)**). Statutory designated sites including SAC, SPA, Ramsar sites and SSSI up to 15km from the Proposed Development have been considered. Several non-statutory designated sites including LNR, LWS, NNR, Ancient Woodland and Ancient Tree Inventory within 2km of the Main Site have also been considered. Further details of these sites and reasons for designations are provided in **Chapter 10: Terrestrial Ecology (ES Volume I, Application Document Ref. 6.1)**.
- 8.4.11 Identified receptors for the operational plant assessment are detailed in Table 8.14 and are shown in **Figure 8.7** and **Figure 8.8 (ES Volume II, Application Document Ref. 6.2)**.

Table 8.14 Identified receptors with potential for air quality impacts from the operational plant assessment for the Proposed Development

ID	Receptor name	Designation	X	Y	Distance and direction from the Main Site
Operational assessment - Human receptors					
R001	Greatham	Residential	449625	527163	3.7km NW
R002	Seaton Carew	Residential	452088	528902	4.3km N
R003	Dormanstown	Residential	458030	523805	4.1km E
R004	Port Clarence	Residential	449337	522190	2.6km SW
R005	Billingham	Residential	447285	524857	4.4km W
R006	Marsh House Lane	Residential	449803	526833	3.3km NW
R007	Saltview Terrace	Residential	450089	521652	2.4km SW
R008	Normanby Road	Residential	453406	520890	2.5km S
R009	Warrenby	Residential	457950	525045	4.2km E
R010	Cowpen Bewley	Residential	448280	524753	3.4km W
Operational assessment - Ecological receptors					
E001	Teesmouth and Cleveland Coast	SSSI and Ramsar	453525	525480	1.1km N
E002	North Yorks Moors	SAC, SPA and SSSI	461290	513666	10.5km SE
E003	Northumbria Coast	SPA	448223	537446	13.5km N
E004	Durham Coast	SAC	448164	537409	12.8km N
E005	Lovell Hill Pools	SSSI	459638	519116	4.9km SE
E006	Saltburn Gill	SSSI	467001	521269	9.7km E
E007	Hart Bog	SSSI	445296	535374	12.8km NW
E008	Briarcroft Pasture	SSSI	439545	519349	11.5km SW
E009	Pike Whin Bog	SSSI	441449	533370	13.5km NW
E010	Whitton Bridge Pasture	SSSI	438693	522289	12.0km W
E011	Coatham Marsh	LWS	458494	524683	1.3km E
E012	Eston Pumping Station	LWS	456470	523790	2.6km E
E013	Teesmouth	NNR	451848	524955	0.5km N

8.4.12 Within 15km of the Main Site there are three additional SSSIs; Roseberry Topping, Cliffe Ridge and Langbaugh Ridge, which are designated due to their geological features. It is therefore considered that these sites are not likely be affected by emissions from the Proposed Development, as the

Critical Levels and Critical Loads are assigned to sites for the protection of vegetation and ecosystems only. As these SSSIs are designated for geological features only, there are no applicable critical levels or critical loads and therefore they have been screened out from further assessment.

Baseline air quality

- 8.4.13 A 2km study area is generally considered to be appropriate to determine baseline conditions at the Proposed Development (including the Main Site and the Wider Site) to provide an adequate amount of data on the existing conditions and constraints.
- 8.4.14 Existing air quality conditions in the vicinity of the Proposed Development have been evaluated through a review of Local Authority air quality management reports, Defra published data and other sources. The key pollutants of concern resulting from construction and operation of the Proposed Development and that have potentially elevated background concentrations from other sources are NO_x, NO₂, PM₁₀, PM_{2.5}, SO₂, CO, NH₃, VOCs (as benzene), HCl, HF, mercury, dioxins and various metals (Sb, As, Cd, Cr, Co, Cu, Mn, Pb, Ni, Tl and V).

Sources of air pollution

- 8.4.15 Industrial air pollution sources are regulated through a system of operating permits or authorisations, requiring stringent emission limits to be met and ensuring that any releases to the environment are minimised or rendered harmless. Regulated (or prescribed) industrial processes are classified as Part A(1), A(2), Part B or Medium Combustion Plant (MCP) processes, and are regulated through the Environmental Permitting regime. The larger, more polluting processes are regulated by the EA, and the smaller less polluting ones by the local authorities. Local authorities regulate process where there are emissions to air only, whereas the EA regulates emissions to air, water and land.
- 8.4.16 A high-level review indicated that there are a total of 25 existing Part A(1) processes within 2km of the Main Site listed on the EA website [Ref 67]. Table 8.15 provides details on the 12 installations with permitted emissions to air. The impact of these processes, as well as other smaller industrial processes further from the Proposed Development are assumed to be represented in the background concentrations outlined in Table 8.18.

Table 8.15 Industrial processes within 2km of the Proposed Development

Site Name and Operator	Environmental Permit Reference	EPR Schedule 1 activity description	Distance (km)
CATS Terminal Wood Group UK Limited	EPR/SP3839RU	Gasification, liquefaction and refining activities. Section 1.2 Part A (1) (a).	0.1

Site Name and Operator	Environmental Permit Reference	EPR Schedule 1 activity description	Distance (km)
		Combustion activities; Any fuel in a furnace >20MW but <50MW. Section 1.1 Part B (a)(ii).	
Fine Organics Seal Sands Facility Fine Organics Limited	EPR/PP3439GG	Organic chemicals (various). Section 4.1 Part A (1) (a) (i), (ii), (iii), (iv), (v), (vi), (vii) and (viii). Producing plant health products or biocides. Section 4.4 Part A (1) (a). Producing pharmaceuticals using chemical/biological processes. Section 4.5 Part A (1) (a). Manufacturing activities involving carbon disulphide or ammonia. Section 4.7 Part A (1) (a).	0.2
Fine Environmental Services	EPR/ZP3438CF	The incineration of hazardous waste in a waste incineration plant or waste co-incineration plant with a capacity exceeding 10 tonnes per day - 5.1 A(1) a)	0.2
Port Clarence Non-Hazardous Landfill Site Augean North Limited	EPR/BV1402IC	Waste Landfilling; >10 tonnes/day, capacity >25,000 tonnes. Section 5.2 Part A (1) (a). Combustion activities; Waste Derived Fuel >3MW but <50MW. Section 1.1 Part B (b) (iii)	0.2
Teesside Gas Processing Plant PX (TGPP) Limited	EPR/NP3133LV	Gasification, liquefaction and refining activities. Section 1.2 Part A (1) (a).	0.3
North Tees Site, Sabic Petrochemicals Sabic North Tees Storage Sabic UK Petrochemicals Limited	EPR/LP3335RM	Combustion activities; Any fuel >50MW. Section 1.1 Part A (1) (a).	0.4
Seal Sands Terminal (South Site) Greenergy Biofuels Teesside Limited	EPR/EP3334AS	Organic chemicals contain oxygen. Section 4.1 Part A (1) (a) (ii). MCP	0.4
Teesside Power Limited (TV1)	EPR/PP3037JJ	Incineration of non-hazardous waste. Section 5.1 Part A (1) (b). Disposal of > 50 tonnes/day non-hazardous waste (> 100 tonnes/day if	0.6

Site Name and Operator	Environmental Permit Reference	EPR Schedule 1 activity description	Distance (km)
		only anaerobic digestion) by biological treatment. Section 5.4 Part A (1) (a) (i). Combustion activities; Any fuel >50MW. Section 1.1 Part A (1) (a).	
Teesside Power Limited (TV2)	EPR/PP3837JN	Incineration of non-hazardous waste. Section 5.1 Part A (1) (b). Disposal of > 50 tonnes/day non-hazardous waste (> 100 tonnes/day if only anaerobic digestion) by biological treatment. Section 5.4 Part A (1) (a) (i).	
North Tees Aromatics Sabic UK Petrochemicals Limited	EPR/BU4503IW	Organic chemicals such as hydrocarbons. Section 4.1 Part A (1) (a) (i). Combustion activities; Any fuel >50MW. Section 1.1 Part A (1) (a). Disposal of > 50 tonnes/day non-hazardous waste (> 100 tonnes/day if only anaerobic digestion) by physico-chemical treatment. Section 5.4 Part A (1) (a) (ii).	0.6
Teesside Crude Oil Stabilisation Terminal ConocoPhillips (U.K.) Teesside Operator Limited	EPR/QP3004PD	Stabilised crude petroleum. Section 1.2 Part A (1) (e) (ii) The incineration of hazardous waste in an incineration or co-incineration plant with a capacity exceeding 10 tonnes per day. Section 5.1 Part A (1) (a). Disposal or recovery of hazardous waste with a capacity exceeding 10 tonnes/day involving physico-chemical treatment. Section 5.3 Part A (1) (a) (ii). Disposal of > 50 tonnes/day non-hazardous waste (> 100 tonnes/day if only anaerobic digestion) by physico-chemical treatment. Section 5.4 Part A (1) (a) (ii).	1.0
Teesside Beam Mill British Steel Limited	EPR/VP3606BL	Production and processing of ferrous metals (more than 20 tonnes of crude steel per hour). Section 2.1 Part A (1) (c) Combustion activities; Any fuel >50MW. Section 1.1 Part A (1) (a).	1.6
Tees Renewable Energy Plant MGT Teesside Limited	EPR/TP3538GF	Combustion activities; Any fuel >50MW. Section 1.1 Part A (1) (a).	1.7

Transport– traffic emissions

- 8.4.17 In recent decades, atmospheric emissions from transport on a national basis have grown to match or exceed other sources in respect of many pollutants, particularly in urban areas. The nearest major roads are the A1185 and the A178 (Seaton Carew Road/Tees Road), which provide access to the Seal Sands industrial area, linking it with Middlesbrough, Billingham, Seaton Carew and Hartlepool. These roads are likely to be a source of NO_x, PM₁₀, PM_{2.5} and NH₃ emissions.
- 8.4.18 The locality surrounding the Proposed Development is highly industrial, with most traffic likely to be industrial or commuting to the industrial sites. Most other traffic would likely use the A19 or A689 instead and go around the area.

Transport – rail emissions

- 8.4.19 There are no active railway lines within 2km of the Main Site, the nearest is a spur off the Durham Coast Line approximately 2.2km to the south where it terminates at the Navigator Terminals North Tees Rail site.

Transport – shipping emissions

- 8.4.20 The Proposed Development is located on the bank of the River Tees, opposite to Teesport, the sixth largest port in the UK. Due to the size and scale of the port facility, there is likely to be a large number of ship movements in proximity to the Proposed Development as they arrive at the various docks to be loaded and unloaded. Ship movements in relation to the Proposed Development could lead to increases in NO_x, SO₂, PM₁₀ and PM_{2.5} emissions [Ref 56]. However, the pre-existing ship movements will be accounted for in the existing background values.

Local air quality

- 8.4.21 The Proposed Development is located primarily within the local authority area of STBC adjacent to the borders of RCBC and MBC. The Proposed Development is not located in, or adjacent to, an AQMA. There are also no AQMAs in the STBC area [Ref 67].
- 8.4.22 The nearest AQMA is the Scarborough AQMA, approximately 23km to the south east of the Proposed Development. The Scarborough AQMA was declared across the village of Staithes in 2004 for exceedances of the annual and 24-hour mean PM₁₀ air quality objectives alongside the SO₂ 15-minute, hourly and 24-hour mean air quality objectives caused by domestic heating. In 2018, the Scarborough AQMA was amended to cover the annual mean and 24-hour mean PM₁₀ air quality objectives only. Given the distance to the AQMA, it is considered very unlikely that it would be affected by the Proposed Development.

Local air quality monitoring - overview

- 8.4.23 STBC conducts automatic monitoring at three sites, and passive diffusion tube monitoring at 14 sites within their administrative area. However, none are located within 2km of the Main Site [Ref 69].
- 8.4.24 RCBC undertook automatic monitoring at two sites, with passive diffusion tube monitoring at 14 sites during 2024 [Ref 70].
- 8.4.25 MBC also undertook automatic monitoring at two sites, with passive diffusion tube monitoring at 22 sites during 2024 [Ref 71].
- 8.4.26 Details of the monitoring sites within 2km of the Main Site can be found in Table 8.16 and
- 8.4.27 Table 8.17 and are shown in **Figure 8.1: Air Quality – Locations of Air Quality Monitoring Sites (ES Volume II, Application Document Ref. 6.2)**.

Automatic monitoring

- 8.4.28 The nearest automatic monitoring station is the RCBC suburban site RED3 (Redcar Dormanstown), located approximately 750m east of a construction connection corridor for the Proposed Development, and 4km east of the Main Site. Redcar Dormanstown monitored concentrations of NO₂, PM₁₀, PM_{2.5} throughout 2024.
- 8.4.29 The annual mean NO₂ concentration recorded at Redcar Dormanstown in 2024 (the latest year with available monitoring data) was 8.6µg/m³. In the last five years, no exceedances of the annual mean NO₂ AQAL of 40µg/m³ were recorded. There were also no recorded exceedances of the hourly mean NO₂ AQAL of 200µg/m³ (not to be exceeded more than 18 times a year).
- 8.4.30 The annual mean PM₁₀ and PM_{2.5} concentrations recorded at Redcar Dormanstown in 2024 (the latest year with available monitoring data) were 12.4µg/m³ and 6.9µg/m³ respectively. Over the last five years, no exceedances of the annual mean PM₁₀ AQAL (40µg/m³) or the annual mean PM_{2.5} AQAL (20µg/m³) were recorded. There were also no recorded exceedances of the 24-hour PM₁₀ AQAL of 50µg/m³ (not to be exceeded more than 35 times a year).
- 8.4.31 However, due to the distance between this monitoring site and the Main Site, it is not likely to be representative of baseline air quality conditions at the Main Site.

Diffusion tube monitoring

- 8.4.32 Three passive NO₂ diffusion tube monitoring locations were located within 2km of the access and utility corridors for the Proposed Development in

2024. However, these are located further than 2km from the Main Site, and as such, the concentrations measured at these diffusion tubes are not likely be representative of the baseline air quality conditions at the Main Site.

- 8.4.33 All of the passive NO₂ diffusion tubes are operated by RCBC, with no other local authority having any air quality monitoring situated within 2km of the Proposed Development. The closest passive NO₂ diffusion tube monitoring location to the Proposed Development is the triplicate co-located site R17, R18, R19 (Dormanstown) operated by RCBC, located approximately 750m east of a construction access corridor for the Proposed Development.
- 8.4.34 In 2024, an annual mean NO₂ concentration of 10.3µg/m³ was recorded at the suburban RCBC site R17, R18, R19 (Dormanstown), which is well below the annual mean NO₂ AQAL. This also shows a reduction in the NO₂ concentration recorded at this site in both 2022 and 2023.
- 8.4.35 The maximum annual mean NO₂ concentration recorded in 2024 out of the three passive NO₂ diffusion tubes within 2km of the Proposed Development was 17.8µg/m³, recorded at the roadside monitoring location R27 (West Lane), which falls below the annual mean NO₂ AQAL.
- 8.4.36 There are no urban background monitoring locations within the RCBC local authority area. The closest urban background monitoring locations are located in MBC local authority area. These are M2 and M15, both located 2.5km south of the access and utility corridors for the Proposed Development respectively.

Table 8.16 NO₂ Diffusion tube monitoring locations within 2km of the Proposed Development

Site ID	Monitoring location	Local Authority	Site Type	Grid Reference		Distance (km)
				X	Y	
R17, R18, R19	Dormanstown	RCBC	Suburban	458379	523486	0.8
R27	West Lane	RCBC	Roadside	454712	520678	1.9
R51	Broadway	RCBC	Suburban	455379	520543	1.8

Table 8.17 Diffusion tube annual mean NO₂ concentrations

Site ID	Monitoring location	Local Authority	NO ₂ concentration (µg/m ³)				
			2020	2021	2022	2023	2024
R17, R18, R19	Dormanstown	RCBC	13.2	11.5	11.7	11.6	10.3
R27	West Lane	RCBC	21.0	23.1	20.6	21.1	17.8

Site ID	Monitoring location	Local Authority	NO ₂ concentration (µg/m ³)				
			2020	2021	2022	2023	2024
R51	Broadway	RCBC	11.7	12.1	11.8	11.5	11.6

Defra background concentrations

- 8.4.37 Background data for 2024 (based on the Defra 2021 background maps) has been obtained from Defra published maps for the relevant grid squares containing the Main Site [Ref 72]. Background concentrations for the grid squares covering the relevant ARNs are included within **Appendix 8A: Construction Air Quality Assessment** and **Appendix 8B: Operational Air Quality Assessment (ES Volume III, Application Document Ref. 6.3)**.
- 8.4.38 Background concentrations refer to the existing levels of pollution in the atmosphere, produced by a variety of stationary and non-stationary sources such as roads and industrial processes. The Defra website [Ref 72] includes estimated background pollutant concentrations for NO₂, PM₁₀ and PM_{2.5} for each 1km-by-1km OS grid square in the UK.
- 8.4.39 Table 8.18 shows the Defra predicted background concentrations from 2024 for the relevant grid squares within the Main Site and
- 8.4.40 Table 8.19 shows the Defra predicted background concentrations for the selected human receptors.
- 8.4.41 Background concentrations of CO, SO₂ and VOCs (as Benzene) have been taken from the 2010 Pollution Climate Mapping (PCM) background maps in line with the Background Concentrations Maps User Guide [Ref 73] and as advised by the LAQM Helpdesk.

Table 8.18 Defra background pollutant concentrations from 2024 - Main Site

OS grid coordinate (m)		2024 Annual mean concentrations (µg/m ³)						
X	Y	NO ₂	NO _x	PM ₁₀	PM _{2.5}	CO	SO ₂	VOCs
451500	523500	10.9	14.4	8.9	5.2	217	2.0	0.4
452500	523500	11.6	15.4	8.7	5.3	219	3.2	0.4
453500	523500	14.1	19.1	8.8	5.4	224	4.1	0.5
451500	524500	12.2	16.4	9.6	5.3	224	1.8	0.4
452500	524500	14.5	19.9	10.1	5.4	232	2.8	0.4
453500	524500	22.6	33.8	10.2	6.6	227	7.9	0.5

Table 8.19 Defra background pollutant concentrations from 2024 at the selected human receptors

Receptor ID	OS grid coordinate (m)		2024 Annual means concentrations (µg/m³)						
	X	Y	NO ₂	NO _x	PM ₁₀	PM _{2.5}	CO	SO ₂	VOCs
R001	449625	527163	8.1	10.5	10.4	5.3	218	1.7	0.4
R002	452088	528902	9.5	12.3	9.4	5.2	221	2.1	0.4
R003	458030	523805	10.9	14.3	9.6	5.6	221	2.2	0.5
R004	449337	522190	12.7	17.1	9.9	5.7	220	2.0	0.5
R005	447285	524857	14.6	20.0	10.4	6.4	224	2.3	0.5
R006	449803	526833	8.6	11.1	10.8	5.3	216	1.5	0.4
R007	450089	521652	11.5	15.3	9.7	5.6	220	2.2	0.5
R008	453406	520890	11.3	14.9	10.6	6.2	225	2.1	0.5
R009	457950	525045	10.8	14.2	8.2	5.0	214	2.1	0.5
R010	448280	524753	12.3	16.5	10.8	5.6	218	2.4	0.5

Ozone

8.4.42 The Air Quality Standards Regulations (2010) [Ref 1] set a target long term objective level for ozone (O₃) for the protection of vegetation, assessed using AOT40 - a metric which sums up how much ozone exceeds 80µg/m³ during daylight hours from May to July in a given year; the target is set as a five-year average of these annual cumulative values. A five-year average AOT40 value of greater than 6,000µg/m³·h indicates exceedance of the long-term objective for ozone (for the protection of vegetation).

8.4.43 In the vicinity of the Proposed Development, an average AOT40 value (across 2018 to 2024) has been estimated to fall in the range of 4,001 – 6,000µg/m³·h from Figure 5.12 of the Air Pollution in the UK 2024 Report produced by Defra [Ref 74]. In 2024, a maximum AOT40 value of 2,777µg/m³·h was reported in the vicinity of the Proposed Development (within STBC authority area) as reported on the UKAIR Dataset (Ozone AOT40 Long Term Objective 2024 – Compliance Status by Local Authority) [Ref 61]. Therefore, the surrounding O₃ concentrations in the vicinity of the Proposed Development are expected to be below the long-term ozone objective level for the protection of vegetation.

Additional background concentrations

8.4.44 Background concentrations for the additional pollutants outlined in Table 8.1 and Table 8.3 have been selected based on data availability and proximity to the Proposed Development. Data has been sourced from the most relevant Defra monitoring network for the respective pollutant and the

selected background concentrations, and their sources are shown below in Table 8.20.

- 8.4.45 Multiple years and sites have been reviewed for the various identified pollutants to allow for a reasonable worst-case approach to be taken for the assessment. The year with the most conservative data has been used throughout for the various pollutants.
- 8.4.46 Background concentrations for short-term limits e.g. 24-hour mean, 1-hour mean, and 15-minute values have been calculated as twice the annual mean background concentration, in accordance with the EA Risk Assessment guidance [Ref 15].
- 8.4.47 It should be noted that there is no suitable background data available for thallium. Therefore, in the absence of data, it has been assumed that the background concentration for thallium is $0\mu\text{g}/\text{m}^3$.

Table 8.20 Selected background concentrations for modelled pollutants

Pollutant	Long term concentration	Site Name/Source	Monitoring network	OS Grid Co-ordinate (m)		Site type	Distance to Main Site
				X	Y		
NH3	11.6µg/m³	Brompton (2020)	UK Eutrophying & Acidifying Network (UKEAP): National Ammonia [Ref 75]	438950	498850	Rural Background	28km SW
HF	0.003µg/m³	Expert Panel on Air Quality Standards (EPAQS) [Ref 76]		-	-	-	-
HCl	0.42µg/m³	High Muffles (2011)	UKEAP: Acid Gas & Aerosol [Ref 77]	477552	493869	Rural Background	38km SE
Sb	0.84ng/m³	Heigham Holmes (2012)	UK Heavy Metals Network [Ref 78]	644179	320519	Rural Background	278km SE
As	0.79ng/m³	Scunthorpe Low Santon and Scunthorpe Town (2018 – 2024 Averaged Data)		Scunthorpe Low Santon:		Urban Industrial	118km S
Cd	0.42ng/m³			492936411943			
Cr (III)	3.1ng/m³						
Cr (VI)	0.61ng/m³						
Co	0.17ng/m³			Scunthorpe Town			
Pb	15.0ng/m³			490338410836			
Mn	49.9ng/m³						
Ni	1.1ng/m³						
V	5.2ng/m³						
Hg	1.5ng/m³	Chilbolton Observatory (2024)	UKEAP: Rural Mercury Network [Ref 79]	439390	139078	Rural Background	385km S
Tl	No Suitable Background Value – assumed to be 0µg/m³						

Pollutant	Long term concentration	Site Name/Source	Monitoring network	OS Grid Co-ordinate (m)		Site type	Distance to Main Site
				X	Y		
PCDD/F Dioxins/Furans)	3.6fgTEQ/m ³	Hazelrigg (2013 – 2016)	Toxic Organic Micro Pollutants (TOMPs) Network [Ref 80]	349286	457793	Rural Background	122km SW

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APIS backgrounds

- 8.4.48 Background information for NO_x, NH₃ and SO₂, for the assessment of impacts for ecological receptors have been taken from the APIS website [Ref 14] for the OS grid squares containing the selected ecological receptors for both the construction and operational assessments. In addition, background concentrations for nutrient nitrogen and acid deposition are also provided from this source.
- 8.4.49 APIS reports values as a three-year average for each grid square with the reported data being an average between 2020 and 2022, with 2021 being reported here in Table 8.21 as the mid-year.

Table 8.21 APIS background pollutant concentrations from 2021 at the selected ecological receptors

Receptor ID	OS grid coordinate		2021 Annual mean concentrations				
	X	Y	NO _x (µg/m ³)	NH ₃ (µg/m ³)	SO ₂ (µg/m ³)	Nutrient Nitrogen Deposition (kg N/ha/yr)	Acid Deposition (keq/ha/yr)
CE001	450500	523713	19.3	1.4	2.4	14.0	1.2
CE002	450688	523724	19.3	1.4	2.4	14.0	1.2
CE003	450860	522636	16.9	1.5	2.2	13.7	1.2
CE004	450186	521692	18.4	1.6	2.3	14.1	1.2
CE005	448982	522611	22.7	1.6	3.4	14.7	1.3
CE006	447117	520768	19.7	1.8	3.1	14.3	1.2
CE007	448986	524676	18.4	1.4	3.2	14.4	1.2
CE008	450639	523536	19.3	1.4	2.4	14.0	1.2
CE009	447971	525275	14.6	1.5	2.2	14.6	2.2
CE010	447434	519469	20.5	1.8	2.2	15.0	1.3
CE011	444777	523134	14.6	1.7	3.3	28.7	2.3
CE012	444557	523124	14.6	1.7	3.3	15.5	1.3
CE013	444176	523790	14.6	1.7	3.3	15.5	1.3
CE014	447376	519758	20.5	1.8	3.3	15.0	1.3
SE001	454272	526950	28.9	1.3	2.9	13.5	1.2
SE002	455556	527008	18.7	1.3	2.1	12.5	1.1
SE003	453959	526193	19.3	1.3	2.5	13.5	1.2
SE004	454278	528315	15.6	1.2	2.1	13.4	1.2
SE005	455624	527450	18.7	1.3	2.1	12.5	1.1
SE006	453586	525412	30.7	1.3	3.6	13.3	1.2

Receptor ID	OS grid coordinate		2021 Annual mean concentrations				
	X	Y	NO _x (µg/m ³)	NH ₃ (µg/m ³)	SO ₂ (µg/m ³)	Nutrient Nitrogen Deposition (kg N/ha/yr)	Acid Deposition (keq/ha/yr)
SE007	454702	526166	28.9	1.3	2.9	12.9	1.1
E001	453525	525480	30.7	1.4	3.6	13.3	1.2
E002	461310	513670	6.4	1.0	0.9	15.5	1.3
E003	448220	537470	7.0	1.5	1.1	13.4	1.1
E004	449335	536200	8.0	1.5	1.3	13.5	1.1
E005	459640	519100	9.6	1.3	1.4	13.5	1.1
E006	467030	521250	7.8	1.1	1.2	21.8	1.7
E007	445290	535380	8.1	1.6	1.1	14.8	1.2
E008	439510	519335	7.8	1.9	1.2	16.2	1.3
E009	441475	533415	7.3	1.5	1.1	15.7	1.3
E010	438690	522285	7.8	1.9	1.2	16.1	1.3
E011	457860	524990	20.9	1.3	4.1	12.2	1.0
E012	456470	523790	18.3	1.4	2.5	12.7	1.1
E013	453525	525480	30.7	1.4	3.6	13.8	1.2

Future baseline

- 8.4.50 Background concentrations of pollutants are expected to decrease in the future due to improvements in emissions technology and a newer vehicle fleet; however, to provide a conservative prediction of pollutant concentrations in the future, the current baseline background concentrations are used for the future operational assessment scenarios, assuming no decrease in background concentrations.
- 8.4.51 Background concentrations for short-term AQALs such as 1-hour mean NO₂ values have been calculated as twice the annual mean background concentration, in accordance with EA Risk Assessment guidance [Ref 15]. For short term daily AQALs, such as the NO_x daily critical level for ecological receptors, background has been calculated as 1.5 times the annual mean background concentration, in line with EA advice on similar projects.

8.5 Development design and impact avoidance

Construction

Construction Environmental Management Plan (CEMP)

- 8.5.1 Emissions of dust and particulates from the construction phase of the Proposed Development will be controlled in accordance with good industry practice, through incorporation of reasonably appropriate control measures according to the risks posed by the activities undertaken, as determined through this assessment process. The management of dust and particulates and application of adequate mitigation measures will be enforced through embedding appropriate measures in detailed Construction Environmental Management Plans (CEMP).
- 8.5.2 A framework CEMP (fCEMP) is being developed as part of the Application submission (see **Appendix 5A: Outline Construction Environmental Management Plan, ES Volume III, Application Document Ref. 6.3**). The fCEMP notes that detailed CEMPs may incorporate a dust management plan where relevant. Schedule 2 (Requirements) of the **draft Development Consent Order (DCO) (Application Document Ref. 3.1)** secures that no part of the authorised development, save for preliminary works, may commence until a detailed CEMP for that part has been approved by the relevant planning authority in consultation with the relevant consultees. The detailed CEMPs will be developed by the EPC Contractor in accordance with the principles set out in the fCEMP.
- 8.5.3 Based on an initial assessment of the Proposed Development activities and surrounding area, of the area's sensitivity to dust impacts and the likely risk of impacts arising from each of the key construction activities (earthworks, construction, demolition and 'trackout' of material onto roads (see **Appendix 8A: Construction Air Quality Assessment (ES Volume III, Application Document Ref. 6.3)**), appropriate embedded measures to be implemented during construction and good site techniques that draw from the IAQM construction dust guidance [Ref 58] that may include:
- avoid mechanical roughening or grinding of concrete surfaces, where appropriate and reasonably practicable;
 - store sand and aggregates in bunded areas and store cement powder and fine materials in silos, where appropriate and reasonably practicable;
 - to the extent appropriate and practicable, use water suppression and regular cleaning to minimise mud on roads, and control dust during earth moving activities;

- as appropriate, cover vehicles leaving the construction site that are carrying waste materials or spoil;
 - to the extent reasonably required, employ wheel wash systems at site exits;
 - restrict, where practicable, the use of unmade road accesses;
 - minimise, to the extent practicable, duration of storage of topsoil or spoil during pipeline construction; and
 - prohibit open fires on site.
- 8.5.4 Good practice will also be employed for the siting and operation of NRMM to control associated emissions, including:
- minimise vehicle and plant idling;
 - where reasonably practicable, locate static plant away from sensitive boundaries or receptors; and
 - where practicable minimise operating time outside of core working hours/daylight hours.

Operation

IED/BAT-AEL Emission Limit Value compliance

- 8.5.5 The Proposed Development will be designed such that process emissions to air comply with the relevant ELVs requirements specified in either the IED [Ref 81], or, if tighter, the relevant BREF/BATC BAT-AELs, as detailed in **Appendix 8B: Operational Air Quality Assessment (ES Volume III, Application Document Ref. 6.3)**. This will be regulated by the EA through the Environmental Permit required for the operation of the Proposed Development.

Stack height

- 8.5.6 The proposed stack heights for the Proposed Development (as detailed in **Appendix 8B: Operational Air Quality Assessment (ES Volume III, Application Document Ref. 6.3)**) have been assessed as a worst-case with consideration given to minimisation of ground-level air quality impacts against the visual impacts of taller stacks. The heights are based on current worst-case building massings of the main structures of the Proposed Development.
- 8.5.7 Dispersion modelling has been undertaken to determine the optimum height of the stacks at the current stage of design, through comparison of the maximum impacts at human health and ecological receptors, to result in impacts at sensitive receptors that are considered to be acceptable.

Stack emissions controls

- 8.5.8 The impact assessment is based on emissions performance for the different emissions points that have been confirmed as being achievable through primary combustion control techniques.
- 8.5.9 In order to meet the BAT-AELs, emissions of NO_x from the Proposed Development will be controlled through various measures including primary emission controls such as the use of low-NO_x burners and secondary abatement controls such as Selective Non-Catalytic Reduction/Selective Catalytic Reduction (SNCR/SCR). This is considered to be embedded mitigation.
- 8.5.10 As the use of SNCR/SCR as a form of embedded mitigation to reduce NO_x emissions can result in an emission of NH₃ slip, further abatement through additional mitigation may be required (such as wet scrubbing) to reduce the potential emissions of NH₃ to ensure that nitrogen deposition impacts are considered acceptable.
- 8.5.11 The use of embedded mitigation and additional mitigation has been considered as part of the assessment. The NO_x and NH₃ concentrations from both the CHP plant and SAF Production Facility have been modelled at both the BAT-AELs and subsequently at lower concentrations associated with the additional mitigation measures that may be required due to the installation of SNCR/SCR. This was undertaken in order to demonstrate the effect that the differing levels of mitigation has on the annual mean NO_x and nitrogen deposition impacts at selected sensitive ecological receptors.
- 8.5.12 It is considered that the use of additional technologies to reduce emissions beyond the BAT-AELs would be considered as additional mitigation, and therefore the results of this scenario are presented in Section 8.7. Such additional mitigation would be subject to a BAT Assessment and CBA that would be required to support the Environmental Permit application for operation of the Proposed Development.
- 8.5.13 The final determination on the level of mitigation required will be decided as part of the Environmental Permit application.

Operational dust

- 8.5.14 Feedstock handling at the operational Proposed Development has the potential to result in fugitive dust emissions. Dust will be controlled and managed in line with Environment Agency guidance [Ref 82] on controlling such emissions, in line with the requirements of the Environmental Permit that will be required for operation.
- 8.5.15 Feedstock handling systems will be designed in accordance with BAT, which will include the following measures:

- enclosing feedstock handling operations within buildings, wherever possible;
 - enclosing conveyors transporting feedstock around the site;
 - installing filters to vents on storage areas/silos/conveyors;
 - designing and maintaining abatement systems to ensure operating effectively;
 - using good housekeeping practices to make sure your site is clear of dust.
- 8.5.16 The EA's guidance requires sites to have a Dust Management Plan where waste materials that could give rise to dusty materials are stored where sites are located within 1,000m of an AQMA for PM₁₀ or within 500m of a sensitive receptor.
- 8.5.17 Given that appropriate controls will be in place to minimise the potential for dust nuisance to occur, and the distance to sensitive receptors, it is not considered that the Proposed Development would give rise to dust impacts.

[Decommissioning](#)

- 8.5.18 Appropriate best practice mitigation measures will be applied during any decommissioning works and documented in a Decommissioning Environmental Management Plan (DEMP); no additional mitigation for decommissioning of the Proposed Development beyond such best practice is considered necessary at this stage. The predicted air quality effects of eventual decommissioning of the Proposed Development including construction dust and construction traffic movements are considered to be comparable to those assessed for construction activities.

8.6 Likely impact and effects of the Proposed Development Construction

Assessment of construction dust

- 8.6.1 The area sensitive to dust soiling and PM₁₀ health effects has been assessed, as detailed in **Appendix 8A: Construction Air Quality Assessment (ES Volume III, Application Document Ref. 6.3)**, from the sensitivity of receptors and the proximity of the Proposed Development activities to these receptors.
- 8.6.2 The only high sensitivity human receptors identified within 250m of the Proposed Development are situated along the Broadway West and Wilton Avenue on the edge of the Dormanstown area of Redcar.
- 8.6.3 A review of sensitive ecological receptors up to 50m from the Proposed Development and within 50m of the routes used by construction vehicles up to 250m from the Proposed Development entrance has also been undertaken. It was found that the Teesmouth and Cleveland Coast SPA, Ramsar and SSSI site was situated within this distance and therefore could be impacted by dust caused by the construction activities at the site.
- 8.6.4 The assessment has considered risks from demolition/site clearance works, earthworks, construction and trackout (of mud to the road) and, based on the potential scale of activities and the sensitivity of the receptor area (as defined in **Appendix 8A: Construction Air Quality Assessment (ES Volume III, Application Document Ref. 6.3)**).
- 8.6.5 No detailed information is available at this stage in the project development for specific working practices that will take place during demolition, earthworks, construction or trackout since they will be specified by the EPC contractor once they are appointed.
- 8.6.6 As such, a worst-case approach has been undertaken, and it is assumed that the dust emissions magnitude for all four of these activities is high. Based on this conservative assumption, unmitigated dust impacts are considered to be 'medium to low risk' for dust soiling impacts, 'medium to low risk' for human health impacts and 'high risk' for ecological impacts. Therefore, necessary and reasonable mitigation measures appropriate to the scale of perceived risk have been applied as part of the CEMP, to ensure that the impacts of construction dust are **not significant**.

Assessment of construction traffic

Human receptors

- 8.6.7 Table 4.1 to Table 4.3 of **Appendix 8A: Construction Air Quality Assessment (ES Volume III, Application Document Ref. 6.3)** show the

predicted annual mean concentrations of NO₂, PM₁₀ and PM_{2.5} at selected sensitive human health receptors.

- 8.6.8 The impact at all human receptors can be considered negligible, as both the change between the DM and DS scenarios for all receptors is less than 1% of the AQAL; and pollutant concentrations at all receptors are below 75% of the AQAL. There are no exceedances of the air quality objectives. The results for human receptors for the assessed pollutants are therefore considered to be **not significant**.

Ecological receptors

- 8.6.9 Tables 4.4 to 4.7 of **Appendix 8A: Construction Air Quality Assessment (ES Volume III, Application Document Ref. 6.3)** show the relevant information and assessment results for the significance of construction traffic impacts on ecological receptors.
- 8.6.10 Effects can be considered **insignificant** for the majority of receptor locations as the predicted annual mean NO_x and nitrogen deposition concentrations are less than 1% of the relevant critical levels and critical loads.

Annual mean NO_x results

- 8.6.11 For NO_x annual mean, the predicted PCs were greater than 1% of the annual mean NO_x critical level (30µg/m³) at the transect points closest to the ARN for the Teesmouth and Cleveland Coast SPA, Ramsar and SSSI site at receptor locations CE001, CE002, CE003, CE004, CE005, CE006 and CE008, as shown in Table 4.4 of **Appendix 8A: Construction Air Quality Assessment (ES Volume III, Application Document Ref. 6.3)**.
- 8.6.12 At the worst case receptor (CE002), predicted PCs were over 1% of the critical level up to a distance of 110m from the road. The maximum change at the road edge was 1.9µg/m³ at CE002, representing 6.3% of the critical level.
- 8.6.13 At the next worst impacted receptor (CE004) the maximum predicted PC at the road edge represented 3.1% of the critical level, but within 40m from the road, the impacts had reduced to being less than 1%.
- 8.6.14 The long-term PEC at all receptors however is less than 70% of the annual mean NO_x critical level for most of these receptors and therefore impacts at receptors with regards to annual mean NO_x concentrations can be considered to be **insignificant**.
- 8.6.15 The exceptions, where the long-term PEC is more than 70% of the annual mean NO_x critical level, are receptors: CE002 (with a maximum PEC at the road edge of 70.8% of the critical level) and CE005 (with a maximum PEC

at the road edge of maximum of 76.8%). Following discussions with the Applicant's ecologist, it has been concluded that these results can be considered as **not significant**. This is due to the construction traffic data representing a highly conservative scenario involving the peak quarter over the four-year construction period. The effects would be short term and temporary.

- 8.6.16 Given that the critical level was not exceeded and in conjunction with the highly conservative nature of the construction traffic assessment, it is considered that these results can be considered **not significant**.

Annual mean NH₃ results

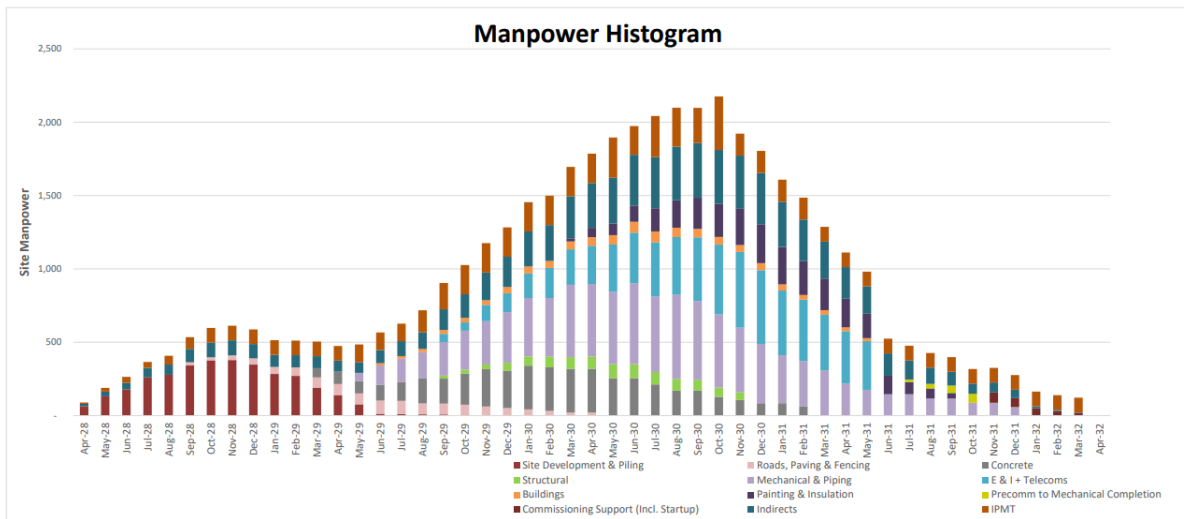
- 8.6.17 For NH₃ annual mean, the predicted PCs were greater than 1% of the annual mean NH₃ critical level (3µg/m³) at transect points closest to the ARN at receptors CE001, CE002, CE003, CE004 and CE008 within the Teesmouth and Cleveland Coast SPA, Ramsar and SSSI site, as shown in Table 4.5 of **Appendix 8A: Air Quality – Construction Assessment (ES Volume III, Application Document Ref. 6.3)**. However, with the exception of CE002, all of these points were within 20m of the road. For CE002, the NH₃ PC is greater than 1% up to a distance of 90m from the road.

- 8.6.18 The PECs are less than 70% of the annual mean NH₃ critical level at all sensitive ecological receptors, and therefore, this can be considered **insignificant** as a result.

Nitrogen Deposition Results

- 8.6.19 For nitrogen deposition, the assessment has considered contributions from both NO_x and NH₃. The full results are presented in Table 4.6 of **Appendix 8A: Construction Air Quality Assessment (ES Volume III, Application Document Ref. 6.3)**.
- 8.6.20 The magnitude of change in nitrogen deposition was >1% of the minimum critical load at transect points closest to the ARN at receptors CE001, CE002, CE003, CE004, CE005 and CE008 within the Teesmouth and Cleveland Coast SPA, Ramsar and SSSI site. For the majority of these receptor locations, this occurred within 60m of the road and only extended beyond this distance at CE002, where 1% was exceeded up to 110m from the ARN. At all receptors there is seen to be a significant drop off in nitrogen deposition in relation to distance from the ARN.
- 8.6.21 Due to the deposition being >1% and the PEC exceeding 70% of the critical load at these locations, nitrogen deposition could not be initially screened out of further assessment.
- 8.6.22 It should be noted that the construction traffic data provided is for 2030, which is the worst case year out of the whole four year construction

programme and represents the overall peak activity of the construction period. The total number of construction workers onsite during 2030 is half of the entire construction workforce for the four year period. The year 2030 has around 2,200 workers onsite per day, in comparison to the next highest year (2029), where there would be approximately half that. In 2028 and 2031 there would be even fewer workers on site (around 500 per day).



Inset 8.5 Predicted number of construction workers histogram

- 8.6.23 Additionally, during 2030, there are two very intensive quarters and two that are less so. The construction traffic data used in this assessment is based on the worst-case month, assuming each month is equally as busy throughout 2030, whereas realistically the flows would be lower as an average across 2030 (around 1,800 per day).
- 8.6.24 As a result, the construction traffic data used in this assessment is highly conservative and likely to be well above the realistic construction traffic flows for this period. This indicates that the air quality results are also highly conservative and predicted impacts would likely be much lower in the other construction years of 2028, 2029 and 2031.
- 8.6.25 Additionally, in the DM scenario, exceedances >70% of the critical load were already observed at these receptor points (where nitrogen deposition changes were >1% of the critical load) due to existing high nitrogen deposition backgrounds, rather than the PC.
- 8.6.26 Following discussion with the Applicant's ecologist, these results can be considered to be **not significant** using professional judgement, given the highly conservative nature of the data used in the modelling, the short term and temporary nature of the construction activities and that nitrogen deposition effects are understood to only be significant in a period over five years [Ref 83].

Acid Deposition Results

- 8.6.27 For acid deposition, the assessment has considered contributions from nitrogen only. The acid deposition rates for the sensitive ecological receptors are less than 1% at all ecological receptors assessed, with the exception of CE002. The PEC for the acid deposition at receptor CE002 is less than 70% of the critical level. The results for acid deposition can therefore be considered as **insignificant** for all receptors.

Assessment of construction shipping

- 8.6.28 Tables 5.1 to 5.16 of **Appendix 8A: Construction Air Quality Assessment (ES Volume III, Application Document Ref. 6.3)** show the relevant information and assessment results for the significance of construction shipping impacts on ecological receptors.

- 8.6.29 Separate assessments were undertaken for Phase 1 and Phase 2 of the marine construction phase shipping as they are unlikely to occur at the same time. For ecological receptors, impacts in both marine construction phases can be considered negligible as the predicted annual mean NO_x, annual mean SO₂, nitrogen deposition and acid deposition concentrations are less than 1% of the relevant critical levels and loads.

- 8.6.30 Therefore, effects in both of the marine construction phases can be considered **insignificant**.

Assessment of emissions from construction plant (NRMM)

- 8.6.31 The assessment has identified few sensitive human receptors within 250m of the Proposed Development. However, the Teesmouth and Cleveland Coast Ramsar, SPA and SSSI site is situated in very close proximity to the Proposed Development, within 20m at a number of locations.
- 8.6.32 As works within these areas will be phased, NRMM and site plant will only be required to be operational at locations nearest to the sensitive receptors for a limited duration over the overall construction period. Such plant is also likely to be small in size (i.e. <1MW) and will only be operational on an 'as and when required' basis during that particular phase. As such, it is considered that the contribution to annual NO₂ and NO_x concentrations would be insignificant.
- 8.6.33 Emissions from site plant and NRMM will also be controlled by measures set out in the fCEMP to reduce emissions associated with this source, including restriction of their operation within designated areas only, minimising of idling, the enforcement a minimum engine emissions standard and enforcement of maximum site speed limits.

- 8.6.34 Due to these proposed controls, which act as embedded mitigation, it is considered that the potential for NRMM emissions within the Proposed Development to result in air quality impacts on local human health or ecological receptors is considered negligible with reference to the EPUK/IAQM screening criterion [Ref 57]. The effect of NRMM emissions on human health and ecological receptors at the Proposed Development is therefore considered to be **not significant**.

Operation

Assessment of operational traffic

Human Receptors

- 8.6.35 Table 5.1 to Table 5.3 of **Appendix 8B: Operational Air Quality Assessment (ES Volume III, Application Document Ref. 6.3)** show the predicted annual mean concentrations of NO₂, PM₁₀ and PM_{2.5} respectively.
- 8.6.36 The impact at all human receptors can be considered negligible, as both the change between the DM and DS scenarios for all receptors is less than 1% of the AQAL; and pollutant concentrations at all receptors are below 75% of the AQAL. There are no exceedances of the air quality objectives. The results for human receptors for the assessed pollutants are therefore **not significant**.

Ecological receptors

- 8.6.37 Tables 5.4 to 5.7 of **Appendix 8B: Operational Air Quality Assessment (ES Volume III, Application Document Ref. 6.3)** show the relevant information and assessment results for the significance of operational traffic impacts on ecological receptors.
- 8.6.38 For annual mean NO_x, the change between the DM and DS scenarios was less than 1% of the annual mean NO_x critical level at all but one sensitive ecological receptor, which was CE002. However, the change is less than 70% of the annual mean NO_x critical level at all receptors.
- 8.6.39 For annual mean NH₃, the change between the DM and DS scenarios was less than 1% of the annual mean NH₃ critical level at all sensitive ecological receptors.
- 8.6.40 Therefore, impacts at sensitive ecological receptors with regards to annual mean NO_x and NH₃ concentrations can be considered negligible and screened out as **insignificant**.
- 8.6.41 For all but one ecological receptor, deposition impacts can be considered **insignificant** as the predicted nitrogen deposition and acid deposition is less than 1% of the lower critical load.

- 8.6.42 Receptor CE002 transect is above 1% of the critical load for nitrogen deposition. However this receptor is part of a longer transect and is the point along the transect located closest to the modelled ARN. Following discussions with the Applicant's ecologist, CE002 can be excluded as it is located on the road verge on the very edge of the designation. All other receptor points on the CE002 transect are below 1% of the critical load for nitrogen deposition and are considered to be insignificant. It is therefore considered that overall, the impacts at CE002 are **insignificant**.

Assessment of operational shipping

- 8.6.43 Tables 6.1 to 6.8 of **Appendix 8B: Operational Air Quality Assessment (ES Volume III, Application Document Ref. 6.3)** show the relevant information and assessment results for the significance of operational shipping impacts on ecological receptors.
- 8.6.44 For ecological receptors, impacts for operational shipping can be considered negligible as the predicted annual mean NO_x, annual mean SO₂, nitrogen deposition and acid deposition concentrations are less than 1% of the relevant critical levels and loads.
- 8.6.45 Therefore, effects in operational shipping can be considered **insignificant**.

Assessment of worst-case process emissions from operational plant

- 8.6.46 The impact of point source emissions from the Proposed Development at human health receptors has been determined from maximum model outputs at discrete receptor locations. The maximum hourly, daily and annual mean predicted concentrations have been compared with the relevant AQALs, as summarised in Table 8.1 to Table 8.3.
- 8.6.47 The results have been presented at the individual receptor where the maximum concentration occurs as a result of the operation of the Proposed Development in Table 8.22.
- 8.6.48 The detailed concentrations at all identified receptor locations are provided in Table A1.1 – Table A1.38 in Annex A of **Appendix 8B: Operational Air Quality Assessment (ES Volume III, Application Document Ref. 6.3)** for selected sensitive human receptors. Detailed concentrations for sensitive ecological receptors are provided in Table B1.1 – Table B1.5 of Annex B of **Appendix 8B: Operational Air Quality Assessment (ES Volume III, Application Document Ref. 6.3)**.
- 8.6.49 Isopleth figures showing the maximum predicted annual and short-term process contributions of NO₂, NO_x and nutrient nitrogen deposition for the are provided in **Figure 8.11 to Figure 8.16 (ES Volume II, Application Document Ref. 6.2)**.

8.6.50 The dispersion modelling includes a number of conservative assumptions in combination, including:

- reporting of the worst-case results from the five years of meteorological data modelled;
- maximum building sizes within the assessed Rochdale Envelope;
- maximum annual operation for the plant configuration assessed (8,760 hours);
- conservative estimates of background concentrations for the commencement of operation at the receptor locations.
- operation of the plant at proposed emission limits, or maximum concentrations expected from the plant, when annual average emissions are likely to be below these;
- the BATC provides the BAT-AEL for metals as a combined total of Sb + As + Pb + Cr + Co + Cu + Mn + Ni + V with a range of 0.075 – 0.3mg/Nm³. For this assessment, the upper value of the BAT-AEL has been taken to provide a more conservative assumption. It has also been assumed that each constituent metal has been emitted from the Proposed Development at the upper rate of 0.3mg/Nm³, this is again to provide a worst-case scenario, when in reality it is likely that each metal will be emitted at a lower rate; and
- as with the metals listed above, the BATC also listed a combined BAT-AEL for Cd and Tl of <5µg/Nm³. For the purposes of this assessment, both Cd and Tl have been modelled at a conservative emission level of 5µg/Nm³.

Human receptors

8.6.51 A summary of the maximum modelled concentrations at sensitive human receptors are presented below in Table 8.22. A full breakdown of results is presented in **Appendix 8B: Operational Air Quality Assessment (ES Volume III, Application Document Ref. 6.3)**.

8.6.52 All modelled pollutants can be screened out as **insignificant** at all human health receptors in line with the EA Risk Assessment guidance [Ref 15].

8.6.53 Negligible effects have also been predicted for all modelled pollutants in line with the EPUK/IAQM impact descriptors [Ref 57], except for annual mean arsenic (As), where a slight adverse impact was predicted at the worst-case receptor R002 (Seaton Carew). All other modelled sensitive human receptors were predicted to have negligible impacts for annual mean arsenic (As). As the modelled PC and PEC at all sensitive human receptors

is below the AQAL of $5\mu\text{g}/\text{m}^3$ and as the emission rate selected is a conservative assumption based on the total emission of Sb, As, Pb, Cr, Co, Cu, Mn, Ni and V, the impacts on selected sensitive human receptors can be considered **not significant**.

- 8.6.54 For Cr (VI), emissions were modelled at a maximum of 0.03% of the other metals BAT-AEL in this assessment, in line with methodology in the AQMAU Releases from Waste Incinerator guidance [Ref 83]. Negligible impacts were predicted at all modelled sensitive human receptors for annual mean Cr(VI) in line with the EPUK/IAQM impact descriptors. The PC concentrations at all sensitive human receptors were screened out as insignificant in line with the EA Risk Assessment guidance, with the maximum modelled PC 0.05% of the AQAL of $0.00025\mu\text{g}/\text{m}^3$.
- 8.6.55 The maximum modelled PEC was more than 70% of the AQAL, however, this is primarily due to a background concentration selected for Cr (VI), which was taken from Scunthorpe and therefore is likely to be heavily influenced by the operational Steel Works and therefore higher than the conditions around the Proposed Development. It is not known what the exact Cr (VI) background concentration is at the Proposed Development, as this is not routinely monitored in the UK and there is no monitoring of Cr (VI) in close proximity to allow for a reasonable estimate.
- 8.6.56 It is therefore considered that the impacts on selected sensitive human receptors are insignificant for Cr (VI).
- 8.6.57 The BAT-AEL from the LCP co-incineration of waste BREF for the co-incineration of waste of $0.03\text{ngI-TEQ}/\text{m}^3$ for PCDD/F was used for the modelling of PCDD/F, which is more stringent than the BAT-AEL from the Waste Incineration BREF (WI BREF).
- 8.6.58 BAT-AELs are set at levels for the protection of human health, provided that emissions are via an appropriately designed stack to ensure that adequate dispersion is achieved. The modelling assessment has taken this into account and assumed that the PCDD/F that would potentially be emitted would be in the form of the most toxic PCDD/F congener (TCDD). When comparing the results for all other species modelled to the relevant AQALs, it is considered that appropriate dispersion of emissions is achieved from the proposed stack, and therefore it is considered that adequate dispersion of PCDD/F is also achieved and that the impacts would be **negligible**.
- 8.6.59 The assessment of operational impacts on human health result in impacts that can be classified as **not significant**.

Table 8.22 Summary impacts for all pollutants at the worst case receptor

Pollutant	Averaging period	AQAL ($\mu\text{g}/\text{m}^3$)	PC ($\mu\text{g}/\text{m}^3$)	PC/ AQAL %	Magnitude of impact	BC ($\mu\text{g}/\text{m}^3$)	PEC ($\mu\text{g}/\text{m}^3$)	PEC/ AQAL %	Significance of effect
NO ₂	Annual mean	40	0.2	0.5%	Negligible	9.5	9.6	24.1%	Insignificant
	Hourly mean (as the 99.79 th %ile)	200	4.1	2.1%	Negligible	22.5	26.6	13.3%	Insignificant
PM ₁₀	Annual mean	40	<0.1	<0.1%	Negligible	9.4	9.4	23.4%	Insignificant
	24-hour mean (as the 90.41 st %ile)	50	<0.1	0.2%	Negligible	18.7	18.8	37.6%	Insignificant
PM _{2.5}	Annual mean	12	<0.1	0.1%	Negligible	5.2	5.2	43.5%	Insignificant
CO	Maximum daily running 8-hour mean	10,000	3.0	<0.1%	Negligible	441.0	444.0	4.4%	Insignificant
	Hourly mean (as the 100 th %ile)	30,000	9.0	<0.1%	Negligible	451.0	460.0	1.5%	Insignificant
SO ₂	24-hour mean (as the 99.2 nd %ile)	125	1.0	0.8%	Negligible	4.1	5.1	4.1%	Insignificant
	Hourly mean (as the 99.7 th %ile)	350	3.6	1.0%	Negligible	4.2	7.8	2.2%	Insignificant
	15-minute mean – (as the 99.9 th %ile)	266	6.7	2.5%	Negligible	4.2	10.9	4.1%	Insignificant
VOCs	Annual mean	5	<0.1	0.1%	Negligible	0.4	0.4	8.5%	Insignificant
	24-hour mean (as the 100 th %ile)	30	0.1	0.4%	Negligible	0.8	0.9	3.0%	Insignificant
NH ₃	Annual mean	180	<0.1	<0.1%	Negligible	11.6	11.6	6.5%	Insignificant
	Hourly mean (as the 100%ile)	2,500	<0.1	<0.1%	Negligible	23.2	23.3	0.9%	Insignificant

Pollutant	Averaging period	AQAL ($\mu\text{g}/\text{m}^3$)	PC ($\mu\text{g}/\text{m}^3$)	PC/ AQAL %	Magnitude of impact	BC ($\mu\text{g}/\text{m}^3$)	PEC ($\mu\text{g}/\text{m}^3$)	PEC/ AQAL %	Significance of effect
HCl	Hourly mean (as the 100 th ile)	750	0.8	0.1%	Negligible	0.8	1.6	0.2%	Insignificant
HF	Annual mean	16	<0.1	<0.1%	Negligible	<0.1	<0.1	0.1%	Insignificant
	Monthly mean (as the 100 th ile)	16	<0.1	<0.1%	Negligible	<0.1	<0.1	<0.1%	Insignificant
	Hourly mean (as the 100 th ile)	160	0.2	0.1%	Negligible	<0.1	0.2	0.1%	Insignificant
Sb	Annual mean	5	<0.1	<0.1%	Negligible	<0.1	<0.1	<0.1%	Insignificant
	Hourly mean (as the 100 th ile)	150	<0.1	<0.1%	Negligible	<0.1	<0.1	<0.1%	Insignificant
As	Annual mean	0.006	<0.001	6.4%	Slight adverse	<0.001	0.0012	19.5%	Insignificant ^[1]
Cd	Annual mean	0.005	<0.001	0.1%	Negligible	<0.001	<0.001	8.5%	Insignificant
	24-hour mean (short term, as the 100 th %ile)	0.03	<0.001	0.2%	Negligible	<0.001	0.001	2.9%	Insignificant
Cr III	Hourly mean (as the 100 th ile)	2.0	0.003	0.2%	Negligible	0.003	0.006	0.3%	Insignificant
Cr VI	Annual mean	0.00025	1.1E-07	0.05%	Negligible	0.0006	0.0006	245%	Insignificant
Pb	Annual mean	0.25	<0.01	0.2%	Negligible	0.01	0.02	6.1%	Insignificant
Ni	Annual mean	0.02	<0.001	1.9%	Negligible	0.001	0.001	7.5%	Insignificant
	Hourly mean (as the 100 th %ile)	0.7	0.03	4.1%	Negligible	<0.01	0.03	4.4%	Insignificant
Co	Annual mean	0.2	<0.1	0.2%	Negligible	<0.1	<0.1	0.3%	Insignificant

Pollutant	Averaging period	AQAL ($\mu\text{g}/\text{m}^3$)	PC ($\mu\text{g}/\text{m}^3$)	PC/ AQAL %	Magnitude of impact	BC ($\mu\text{g}/\text{m}^3$)	PEC ($\mu\text{g}/\text{m}^3$)	PEC/ AQAL %	Significance of effect
	Hourly mean (as the 100 th %ile)	6.0	0.03	0.5%	Negligible	<0.01	0.03	0.5%	Insignificant
Cu	24-hour mean (short term, as the 100 th %ile)	0.05	<0.01	6.5%	Negligible	<0.01	<0.01	16.8%	Insignificant
Mn	Annual mean	0.15	<0.01	0.3%	Negligible	0.05	0.05	33.5%	Insignificant
	Hourly mean (as the 100 th %ile)	1,500	0.03	<0.1%	Negligible	0.10	0.13	0.01%	Insignificant
Hg	24-hour mean (as the 100 th %ile)	0.06	<0.01	0.1%	Negligible	<0.1	<0.1	2.7%	Insignificant
	Hourly mean (as the 100 th %ile)	0.6	<0.001	0.1%	Negligible	0.003	0.004	0.6%	Insignificant
Tl	Annual mean	1.0	<0.1	<0.1%	Negligible	n/a – No Suitable Background Value			Insignificant
	Hourly mean (as the 100 th %ile)	30	0.03	0.1%	Negligible	n/a – No Suitable Background Value			Insignificant
V	24-hour mean (as the 100 th %ile)	1.0	<0.1	0.3%	Negligible	<0.01	<0.01	1.4%	Insignificant
Dioxins/Furans (PCDD/F)	Annual mean	N/A	3.6×10^{-11}	N/A	Negligible	3.6×10^{-9}	3.6×10^{-9}	N/A	Insignificant
AQAL = Air Quality Assessment Level, PC = Process Contribution, BC = Background Concentration, PEC = Predicted Environmental Concentration ^[1] As has been modelled at the BAT-AEL for “other metals”, assuming the whole emission is as As. The AQMAU guidance [Ref 83] states that monitoring data has shown that a maximum of 5% of the other metals emission occurs as As, and therefore it is considered that the actual maximum PC would be 0.3% of the As AQAL and therefore would be considered negligible, resulting in an insignificant effect.									

Ecological receptors

- 8.6.60 A summary of the maximum modelled concentrations at sensitive ecological receptors are presented below in Table 8.23 to
- 8.6.61 Table 8.26. A full breakdown of results at all receptors is presented in **Appendix 8B: Operational Air Quality Assessment (ES Volume III, Application Document Ref. 6.3)**.
- 8.6.62 For the modelled sensitive ecological receptors, all modelled pollutants except nutrient nitrogen deposition can be screened out as **insignificant** in line with the EA Risk Assessment guidance [Ref 15] or can be considered **not significant** (PEC below the AQAL).
- 8.6.63 When assessed against the more stringent $75\mu\text{g}/\text{m}^3$ critical level, the impact of the daily NO_x PC at the worst-affected ecological receptor (Teesmouth and Cleveland Coast SPA, Ramsar and SSSI) represents a moderate adverse magnitude of impact, as it exceeds the first stage screening criteria of the EA Risk Assessment guidance at $>10\%$ of the $75\mu\text{g}/\text{m}^3$ critical level [Ref 15]. The PEC ($78.3\mu\text{g}/\text{m}^3$) also represents an exceedance of the critical level, which would suggest the potential for significant impacts.
- 8.6.64 However, the critical level of $75\mu\text{g}/\text{m}^3$ for daily mean NO_x is only applicable to locations where there are high concentrations of SO_2 and Ozone (O_3), which is not the case for the location of the Proposed Development (baseline SO_2 and O_3 concentrations have been presented in Section 0). As such, the IAQM considers that a higher value of $200\mu\text{g}/\text{m}^3$ can be used as a short-term critical level [Ref 24]. When comparing to the higher critical level of $200\mu\text{g}/\text{m}^3$, the worst case PC is $<10\%$ of the AQAL and therefore exceedances are very unlikely, and the impacts can be considered **not significant**.
- 8.6.65 For annual mean NO_x , the contour plot in **Figure 8.15 (ES Volume II, Application Document Ref. 6.2)** shows that the area where the 1% of the critical level is exceeded only represents a small proportion of the habitat site. Additionally, the area where the 1% is exceeded is regularly inundated by the tide (Seal Sands) and therefore there is limited vegetation present that could be impacted by atmospheric concentrations of NO_x . It is therefore considered that annual average NO_x impacts are **not significant**.
- 8.6.66 The nutrient nitrogen deposition results have been based on the lower end of the relevant critical load range for each habitat assessed. The worst-affected receptor is the Teesmouth and Cleveland Coast SPA, Ramsar and SSSI. The modelled nutrient nitrogen deposition for Teesmouth and Cleveland Coast SPA, Ramsar and SSSI is $0.3\text{kgN}/\text{ha}/\text{yr}$ or 5.1% of the

critical load of 5kg N/ha/yr, which would suggest the potential for significant effects.

- 8.6.67 The EA consider depositional impacts that are below 1% of the relevant critical load for a site can be regarded as insignificant. For nitrogen deposition, all sites except Teesmouth and Cleveland Coast SPA, Ramsar and SSSI (receptor points E001a and E001c - E001e) have impacts that can be considered insignificant as they are less than 1% (or less than 100% for LWS) of the lower end of the critical load range.
- 8.6.68 Modelled acid deposition values are below the critical load at all modelled sensitive ecological receptors except at Teesmouth and Cleveland Coast (E001a, E001c and E001d) and Hart Bog (E007) and can therefore be considered **not significant**.
- 8.6.69 At ecological receptors E001a, E001c, E001d (Teesmouth and Cleveland Coast), the acid deposition PC is greater than 1% of the relevant critical load. However, in line with the EA Risk Assessment guidance [Ref 15], although these receptor points have impacts that are over the 1% screening level for determining insignificance, as the PEC is less than 70% of the critical load, the impacts can be considered **insignificant**.
- 8.6.70 Substance deposition to ground has been assessed for a range of metals and is considered to be insignificant for Cd, Cr, Cu and Pb in line with the EA Risk Assessment guidance [Ref 15] due to the PC to Ground (mg/m²/day) being <1% of the respective ground limits. However, this cannot be said for As, Hg and Ni where the maximum deposition to ground values are 6.7%, 1.2% and 1.2% of the ground limit respectively, indicating there may be potential for significant effects. However, the modelling has assumed a conservative emission rate for As and N, by basing it on the total combined emission of Sb, As, Pb, Cr, Co, Cu, Mn, Ni and V in line with the upper end of the BAT-AEL. The emission and the subsequent deposition to ground of As, Hg and Ni is likely to be lower and can likely be considered **not significant**.

Table 8.23 Maximum predicted results of the operational impact assessment for ecological receptors

Species	AQAL ($\mu\text{g}/\text{m}^3$)	PC ($\mu\text{g}/\text{m}^3$)	PC/AQAL %	Magnitude of impact	BC ($\mu\text{g}/\text{m}^3$)	PEC ($\mu\text{g}/\text{m}^3$)	PEC/AQAL %	Significance of effect
NO _x daily mean (as the 100th percentile)	200 ^[1]	7.7	3.7%	Negligible	44.1	51.8	25.9%	Insignificant
NO _x annual mean	30	0.4	1.5%	Major adverse	35.4	35.8	119.4%	Not significant ^[2]
SO ₂ annual mean	20	0.2	0.9%	Negligible	7.0	7.2	35.9%	Insignificant
NH ₃ annual mean	3	0.04	1.37%	Negligible	1.40	1.44	48.1%	Insignificant
HF daily mean (as the 100 th percentile)	5	0.05	1.00%	Negligible	0.006	0.06	1.1%	Insignificant
HF weekly mean (as the 100 th percentile)	0.5	0.02	3.43%	Negligible	0.003	0.02	4.0%	Insignificant
PC = Process Contribution, AQAL = Air Quality Assessment Level, BC = Background Concentration, PEC = Predicted Environmental Concentration Note: ^[1] The critical level is generally considered to be 75 $\mu\text{g}/\text{m}^3$, but this only applies where there are high concentrations of SO₂ and O₃, which is not generally the current situation in the UK. Given the low UK SO₂ and O₃ concentrations in the vicinity of the Proposed Development, the IAQM consider the higher value of 200 $\mu\text{g}/\text{m}^3$ can be used as a short-term AQAL [Ref 24] ^[2] BC already in exceedance of the 30$\mu\text{g}/\text{m}^3$ AQAL (BC 118% AQAL) and therefore impacts from the operation of the Proposed Development on annual mean NO_x can be considered not significant.								

Table 8.24 Maximum predicted nitrogen deposition results for the worst-case ecological receptor

Species	Minimum Critical Load (kg N/ha/yr)	PC N Dry Dep (kg N/ha/yr)	PC/Minimum CL%	BC (kg N/ha/yr)	PEC (kg N/ha/yr)	PEC/CL %	Significance of effect
Nutrient nitrogen deposition	5	0.3	5.1%	13.3	13.6	271.5%	Potentially significant
PC = Process Contribution, CL = Critical Load, BC = Background Concentration, PEC = Predicted Environmental Concentration							

Table 8.25 Maximum predicted acid deposition results for the worst-case ecological receptor

Species	Minimum Critical Load (keq N/ha/yr)	PC Acid Dep (keq N/ha/yr)	PC/CL Function %	BC (keq N/ha/yr)	PEC (keq N/ha/yr)	PEC/CL %	Significance of effect
Acid deposition	0.856	0.05	1.1%	1.17	1.22	30.4%	Insignificant ^[1]
PC = Process Contribution, CL = Critical Load, BC = Background Concentration, PEC = Predicted Environmental Concentration							
^[1] PEC <70% of the lower critical load range, and so can be screened out as insignificant in line with the EA Risk Assessment guidance [Ref 15].							

Table 8.26 Maximum predicted substance ground deposition results for the worst-case ecological receptor

Species	Ground Limit (mg/m ² /day)	PC to Ground (mg/m ² /day)	PC/Ground Limit%	Significance of effect
As	0.02	<0.1	6.7%	Not significant
Cd	0.009	<0.1	0.2%	Insignificant
Cr	1.5	<0.1	0.1%	Insignificant
Cu	0.25	<0.1	0.5%	Insignificant
Pb	1.1	<0.1	0.1%	Insignificant
Hg	0.004	<0.1	1.2%	Not significant
Ni	0.11	<0.1	1.2%	Not significant

Combined operational emissions (plant, road and shipping emissions)

- 8.6.71 For the combined effects of the operational emissions (plant, road and shipping) there is little overlap between the various study areas for the different emission sources. For example, impacts beyond 200m from a road source can be considered insignificant and an assessment of shipping emissions is typically only recommended when there is relevant exposure within 250m or 1km of large ship movements.
- 8.6.72 There are no human receptors within 1km of the shipping movements and all of the identified ecological receptors for the operational shipping assessment are more than 200m from the operational traffic study area.
- 8.6.73 The emissions from the operational plant are the most dominant source and are likely to have the biggest effect on sensitive receptors. However, modelling of the operational plant emissions demonstrated that the impacts can be considered insignificant. The contributions from both operational traffic and operational shipping were also found to be insignificant. Therefore, on this basis it can be considered that the combined impacts from the operational emissions can also be considered **not significant**.

Decommissioning

- 8.6.74 The predicted air quality effects of eventual decommissioning of the Proposed Development are considered to be comparable to, or less than, those assessed for construction activities i.e. **not significant**. This is based upon the assumption that groundwork, traffic movements and site work likely to be required to decommission the Proposed Development would be less than that required for its construction, particularly as no ground improvement works would be expected to take place during decommissioning of the Proposed Development. Appropriate best practice mitigation measures will be applied during any decommissioning works and documented in a DEMP, which must be agreed with the relevant planning authority further to Schedule 2 (Requirement) of the **draft DCO (Application Document Ref. 3.1)**; no additional mitigation for decommissioning of the Proposed Development beyond such best practice is considered necessary at this stage.

Transboundary effects

- 8.6.75 No likely significant transboundary effects have been identified for air quality given the location of the Site and the distance to the nearest other international territory.

8.7 Mitigation and enhancement measures

- 8.7.1 Outlined in the sections below are the proposed mitigation and enhancement measures for the Proposed Development. This includes the embedded mitigation that has been included as part of the design phase, such as the use of a CEMP during the construction phase and the control of emissions to through BPM to meet the BAT-AELs during the operational phase of the Proposed Development. As well as additional mitigation that might be required during the operational phase to further reduce emissions beyond the BAT-AELs due to additional NH₃ slip that may occur due to the installation of SNCR/SCR.

Construction

- 8.7.2 The management of construction phase emissions, including dust and particulates, and the application of adequate embedded mitigation measures will be delivered through the detailed CEMP(s), and through the application of appropriate mitigation according to the risk of dust emissions from the Proposed Development activities, as identified in Section 8.5.
- 8.7.3 Impacts of NRMM will be mitigated by ensuring that these are located away from the order limits where practicable and, where possible, the use of diesel or petrol powered generators will be avoided. The environmental effects from construction traffic and construction shipping associated with the Proposed Development have been identified as not significant, therefore no specific mitigation has been identified as necessary for the construction phase of the Proposed Development.

Operation

- 8.7.4 The environmental effects from operational traffic and operational shipping associated with the Proposed Development have been identified as not significant, therefore no specific mitigation has been identified as necessary for the construction phase of the Proposed Development.
- 8.7.5 The air quality assessment of operational impacts has assumed that the BAT-AELs will be met for the operational plant as required under the IED and in accordance with the use of BAT under the Environmental Permitting regime. As a form of embedded mitigation, the emissions of NO_x will be controlled to the required BAT-AELs through the use of low-NO_x burners and SNCR/SCR.
- 8.7.6 As stated in Section 8.5 due to the use of SNCR/SCR resulting in an additional emission of NH₃ slip, additional mitigation in the form of further abatement (an additional SNCR/SCR to further reduce NO_x and wet scrubbing to reduce NH₃) may be required to reduce the impacts of annual NO_x and nutrient nitrogen deposition from the Proposed Development. This

would be required on the emissions from the CHP plant stack and the SAF process (referred to as the SAF Production Product Pretreatment stack in **Appendix 8B Air Quality – Operational Assessment (ES Volume III, Application Document Ref. 6.3)**). Such additional mitigation would be subject to a BAT Assessment and CBA that would be required to support the Environmental Permit application for operation of the Proposed Development.

- 8.7.7 An additional modelling scenario of the additional mitigation scenario has therefore been carried out at the lower NO_x and NH₃ emission concentrations that would be achievable, with the resulting annual NO_x and nutrient nitrogen deposition impacts at the worst-case ecological receptor shown in Table 8.27 and
- 8.7.8 Table 8.28.
- 8.7.9 At the lower NO_x emission concentration, the annual mean NO_x PC predicted at the worst-case ecological receptor (E001a) was 0.2µg/m³, which represents 0.7% of the AQAL, deemed to be a negligible impact in line with the EPUK/IAQM descriptors. Therefore, the overall effect of annual mean NO_x concentrations in the additional modelling scenario could be screened out as insignificant at all sensitive ecological receptors, in line with the EA Risk assessment criteria [Ref 15].
- 8.7.10 A significant reduction in the nutrient nitrogen deposition PCs was predicted in the additional modelling scenario. At the BAT AELs, PCs in exceedance of 1% of the relevant lower critical load were predicted for ecological receptors E001a, E001c, E001d and E001e (Teesmouth and Cleveland Coast). At the lower NO_x and NH₃ emission concentrations, the predicted PCs were below 1% of the relevant critical load at E001c to E001e. The nutrient nitrogen deposition PC at the worst-case receptor E001a was 1.16% of the relevant critical load as shown in
- 8.7.11 Table 8.28. However, average nutrient nitrogen deposition at this receptor over the five-year period (2020 to 2024) was 0.91% of the critical load (5kgNha/yr), with the potential for significant effects at the worst-case ecological receptor deemed unlikely.
- 8.7.12 An isopleth figure showing the maximum predicted annual PC of nutrient nitrogen deposition with additional mitigation (at the lower NO_x and NH₃ emission concentration) are provided in **Figure 8.17 (ES Volume II, Application Document Ref. 6.2)**.

Table 8.27 Maximum predicted annual mean NO_x results for the worst-case ecological receptor (additional mitigation scenario)

Species	AQAL (µg/m ³)	PC (µg/m ³)	PC/AQAL %	Magnitude of impact	BC (µg/m ³)	PEC (µg/m ³)	PEC/AQAL %	Significance of effect
NO _x annual mean	30	0.2	0.7	Negligible	35.4 ^[1]	35.6	118.6%	Insignificant
PC = Process Contribution, AQAL = Air Quality Assessment Level, BC = Background Concentration, PEC = Predicted Environmental Concentration								
^[1] The background NO _x annual mean concentration at this receptor is already in exceedance of the annual mean NO _x AQAL								

Table 8.28 Maximum predicted nitrogen deposition results for the worst-case ecological receptor (additional mitigation scenario)

Species	Minimum Critical Load (kg N/ha/yr)	PC N Dry Dep (kg N/ha/yr)	PC/Minimum CL%	BC (kg N/ha/yr)	PEC (kg N/ha/yr)	PEC/CL %	Significance of effect
Nutrient nitrogen deposition	5	0.06	1.16%	13.32	13.38	267.6%	Insignificant^[1]
PC = Process Contribution, CL = Critical Load, BC = Background Concentration, PEC = Predicted Environmental Concentration							
^[1] Average nutrient nitrogen deposition PC 0.91% CL across 2020 to 2024.							

- 8.7.13 As a result of the additional mitigation, the environmental effects from operation of the Proposed Development have been identified as **not significant** at all receptors in relation to human health and ecological sites for the operation of the Proposed Development.
- 8.7.14 Emissions monitoring for the operational plant will be required through the Environmental Permit, which will stipulate continuous monitoring of key pollutant emissions from the stacks, with quarterly reporting of the results to the EA. In addition, other emissions will require periodic extractive sampling to demonstrate compliance with the Environmental Permit limits.

8.8 Residual effects and conclusions

Construction and decommissioning

- 8.8.1 The air quality assessment of construction impacts assumes that the measures outlined within Section 8.7 of this Chapter along **with Appendix 8A: Construction Air Quality Assessment (ES Volume III, Application Document Ref. 6.3)** and the fCEMP would be incorporated into the detailed design of the Proposed Development, as they are standard best practice measures that are routinely applied across UK construction sites. No additional mitigation has been identified as necessary for the construction phase of the Proposed Development. For this reason, the residual effects would be as reported within Section 8.6 of this Chapter (i.e. **not significant**).
- 8.8.2 Consistent with construction mitigation, it has been assumed that relevant best practice mitigation measures would be in place during any decommissioning works. No additional mitigation has been identified as necessary for the decommissioning phase of the Proposed Development.

Operation

- 8.8.3 The air quality assessment of impacts at opening has assumed that the BAT-AELs will be met for the operational plant as required and in accordance with use of BAT under the environmental permitting regime.
- 8.8.4 Potential impacts on nearby sensitive human receptors have been assessed as being **not significant**. However, at the BAT-AELs, the potential for significant effects was identified at the closest ecological receptor (Teesmouth and Cleveland Coast) for annual mean NO_x alongside nutrient nitrogen deposition impacts. Accordingly, further abatement of NO_x (additional SNCR/SCR) and NH₃ emissions (wet scrubbing) could be applied, which would reduce the annual mean NO_x concentrations and nutrient nitrogen deposition at this receptor, with the potential impacts identified to be **not significant** following this additional mitigation.

- 8.8.5 The requirement for the additional mitigation would be subject to a CBA that will support the Environmental Permit application for the operational Proposed Development.

Cumulative effects

- 8.8.6 A review of the short list of identified proposed developments provided in **Chapter 22: Cumulative and Combined Effects (ES Volume I, Application Document Ref. 6.1)** indicates that there are a number of developments that could potentially result in cumulative effects with the Proposed Development, mainly with regards to depositional impacts on ecological sites.
- 8.8.7 An assessment of cumulative impacts with other proposed developments that could interact with the impacts and effects of this Proposed Development has been carried out and is detailed in **Chapter 22: Cumulative and Combined Effects (ES Volume I, Application Document Ref. 6.1)**. This assessment found that cumulative effects are not likely to occur as a result of the Proposed Development or those developments listed in the short list and the residual cumulative effect remains not significant.

8.9 Summary of significant effects

- 8.9.1 Summaries of the potential significant effects associated with the construction (and decommissioning) and operation of the Proposed Development are presented in Table 8.29, respectively.

Table 8.29 Summary of significant effects for construction, operation and decommissioning.

Potential impact	Receptor	Sensitivity	Magnitude of impacts*	Likely significant effects	Proposed mitigation	Residual effects
Construction Dust	Human	High	Medium	IAQM does not assign a significance of effect prior to mitigation.	CEMP and best practice measures such as those detailed in the IAQM Construction Dust Guidance [Ref 58]	Not Significant
	Ecological	High	High	IAQM does not assign a significance of effect prior to mitigation.		
Construction Traffic (Roads)	Human	High	Negligible	Not Significant	None	Not Significant
	Ecological	High	-	Not Significant		
Construction Traffic (Shipping)	Human	High	Negligible	Not Significant	None	Not Significant
	Ecological	High	-	Not Significant		
Operational Traffic (Roads)	Human	High	Negligible	Not Significant	None	Not Significant
	Ecological	High	-	Insignificant		
Operational Traffic (Shipping)	Human	High	Negligible	Not Significant	None	Not Significant
	Ecological	High	-	Not Significant		
Operational Plant	Human	High	Negligible	Not Significant	BAT-AEL and embedded mitigation listed in Section 8.2. Additional mitigation	Not Significant
	Ecological	High	-	Not Significant		Potentially significant with embedded mitigation.

Potential impact	Receptor	Sensitivity	Magnitude of impacts*	Likely significant effects	Proposed mitigation	Residual effects
					subject to CBA assessment.	Insignificant with additional mitigation.
Decommissioning Activities	Human	Low	Negligible	Not Significant	None	Not Significant
* Magnitude of impact is not defined for ecological receptors.						

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